



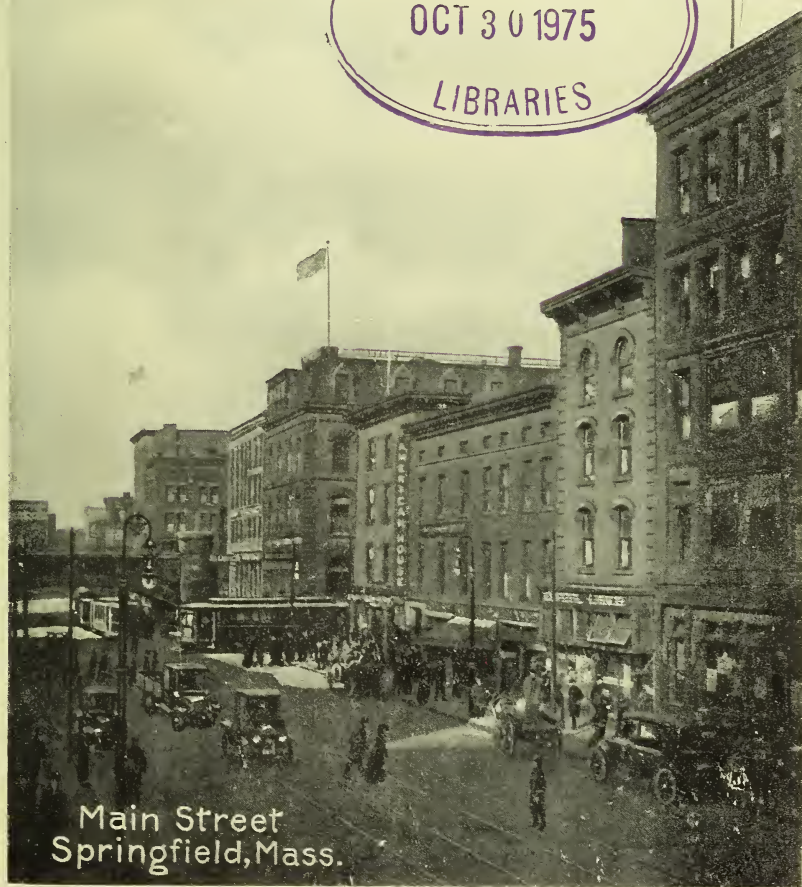


BRILL MAGAZINE

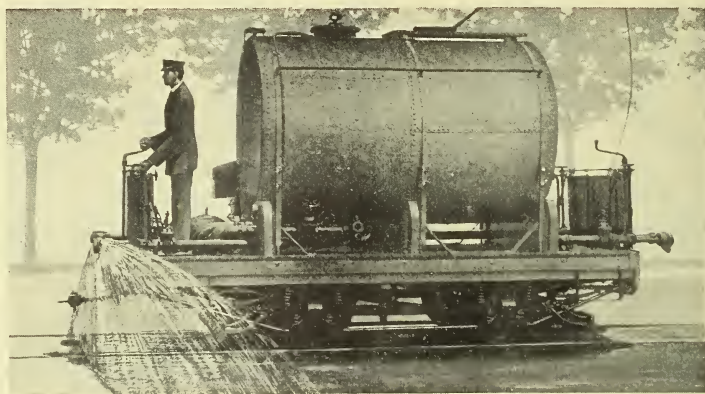
SMITHSONIAN

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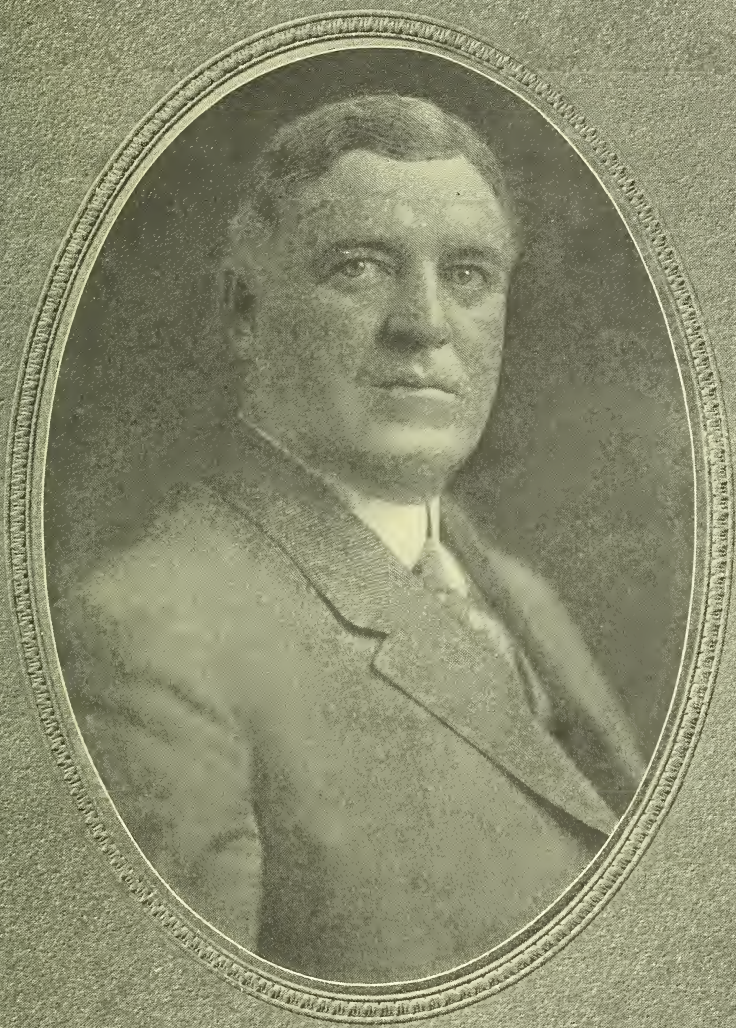
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Main Street
Springfield, Mass.



THE motor-driven centrifugal pump on the Brill Centrifugal Sprinkler Car not only supplies uniform pressure at the sprinkling heads, but eliminates the expense of double riveting and special bracing on the tank, which is necessitated by an air pressure system. The simplicity of the mechanism of the Centrifugal Sprinkler is a tremendous point in the cutting down of operating and maintenance costs. As the centrifugal pump shaft is the only part that receives wear, the possibility of the mechanism becoming heated is eliminated. Another important point is that the type of sprinkling head used permits absolute and immediate control of the volume and range of water, making it possible to direct the flow from a point midway between the rails to a distance of 50 feet outside.



D. J. Hegarty

MANAGER, RAILWAY AND LIGHTING DEPARTMENTS
NEW ORLEANS RAILWAY & LIGHT COMPANY

Experience

Street railway companies—public service corporations generally—in fact, all organizations practicing what is popularly known as big business, long ago recognized the value of men of real experience.

Real experience is that acquired by hard work, combined with keen observation, constant study of conditions and methods and the ability to profit by the mistakes and experience of others.

Such qualities and their fulfilment necessarily produce the broad-minded man—the man whose worth is appreciated by himself, by his employers and by the community—the man who gets results—the producer.

Fortunately for the country, there are many such men, but the time will never come when there will be enough to supply the demand.

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D. A. Hegarty



A. HEGARTY was born in Philadelphia and educated at the University of Pennsylvania. Leaving the university, he became connected with the engineering department of the Pennsylvania Railroad as a rodman and passed through the various grades of the service until he was appointed assistant engineer of construction, also of the maintenance of way department of the Pennsylvania Railroad. He resigned from that company to become associated with A. Langstaff Johnston, pioneer electrical engineer in the railway field, in charge of the work of electrifying the railways in Philadelphia. Mr. Hegarty was engineer in charge of construction, and on the completion of the construction work he became general manager and chief engineer of the Hestonville, Mantua & Fairmount Passenger Railway, commonly known as the Arch Street Line, in Philadelphia. When the companies in Philadelphia were merged, Mr. Hegarty resigned to accept a position with the Norfolk, Va., Railway Company. Resigning from this company, he became manager of the Railways Company General, an operating and construction company having railways, electric light and gas plants in Michigan, New York and Pennsylvania. This company also made a large number of reports and carried on construction work with public utility properties all over the United States, South America and Cuba. Resigning from this position, Mr. Hegarty became vice-president, treasurer and general manager of the Little Rock Railway & Electric Company, and was transferred from this position to the managership of the railway and lighting departments of the New Orleans Railway & Light Company. Mr. Hegarty has always taken an active interest in commercial and civic bodies of the different towns in which he has been located. At the recent convention at Atlantic City he was elected president of the Traffic and Transportation Association, after having served through the offices of the second and first vice-president of this branch of the Association. He is also a member of the National Electric Light Association, serving on the Rate Research Committee. He is a member of the University of Pennsylvania Club of New York, Engineers' Club of Philadelphia, and Chess, Checkers and Whist and Stratford Clubs of New Orleans.

Conditions Which Govern the Type of Car for City Service

Springfield, Massachusetts

SPRINGFIELD, the county seat of Hampden County, Massachusetts, is situated on the east bank of the Connecticut River, 99 miles west of Boston and 24 miles north of Hartford. It was founded in 1836 and was incorporated as a city in 1852. At present, the city covers an area of 38.53 square miles. In point of population, it ranks ninth among New England cities, having, according to conservative

estimates, about 95,000 inhabitants. In point of banking and bank clearings, Springfield ranks third in New England. Situated in the heart of a busy industrial section, the city holds a high place as a manufacturing center and is noted for the diversity of its industries. Principal among these are slaughtering and meat-packing establishments, foundries and machine shops, paper goods, automobile and firearms manufactories and printing and publishing houses. The



SPRINGFIELD TRAFFIC CONDITIONS AND CARS. The lines of the Springfield Street Railway Company serve a population of about 200,000.



SPRINGFIELD TRAFFIC CONDITIONS AND CARS. Panoramic view of the city. Upper section shows State Street. Main Street shown below.

plant of the Wason Manufacturing Company is located at Brightwood, which lies within the northern boundary of the city. In addition to the private manufacture of fire-arms and ammunition, there is also the famous Springfield Arsenal and Armory. The arsenal was estab-

lished by the Continental Congress and began to be used as a repository for arms and ammunition in 1777. The well-known Springfield rifles used in the Civil War were manufactured there, and it is today the principal manufactory of small arms for the United States Army. The last census credits the city with 346 manufacturing establishments of various descriptions, in

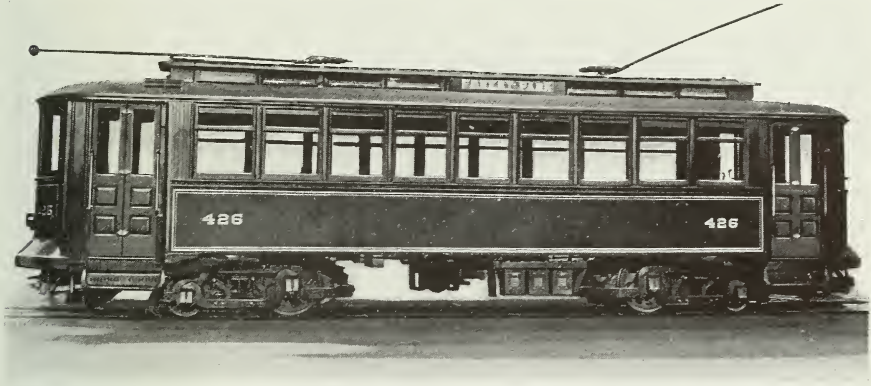


SPRINGFIELD TRAFFIC CONDITIONS AND CARS. The cars are handsomely finished in mahogany with marquetry ornamentation.

lished by the Continental Congress and began to be used as a repository for arms and ammunition in 1777. The well-known Springfield rifles used in the Civil War were manufactured there, and it is today the principal manufactory of small arms for the United States Army. The last census credits the city with 346 manufacturing establishments of various descriptions, in

taken and, therefore, these figures would have to be amplified to some extent to show the standing today. Several railroads provide ample shipping facilities.

Aside from manufacturing and wholesale business, Springfield enjoys an excellent retail trade, being the center of a wide suburban territory. Its retail establishments compare most favorably with those

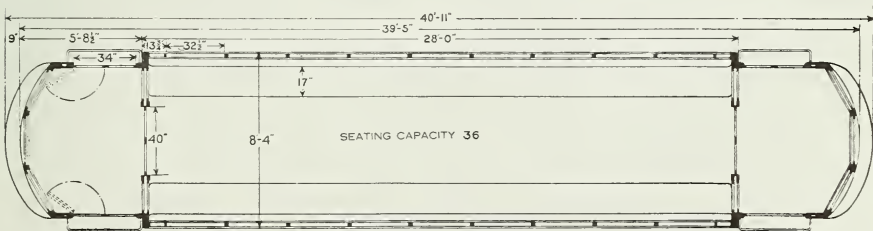


SPRINGFIELD TRAFFIC CONDITIONS AND CARS. Upper sashes are stationary, while lower sashes are arranged to raise.

of even larger cities. It contains a number of very fine commercial buildings and its residential districts are filled with handsome homes, most of the streets being bordered by fine shade trees in which the residents take justifiable pride. Probably the principal point of interest in the building line is what is known as the Municipal Group. These buildings are situated on the north side of Court Square and were erected at a cost of about three millions of dollars. The group comprises two buildings with a high campanile in the center, in which is hung one of the finest sets of chimes in that part of the country, and for which a

municipal bellringer is employed. One of the buildings, which can be seen in one of the accompanying illustrations, houses the municipal offices, while the other contains a magnificent auditorium, which is especially adapted to conventions, having large seating capacity and the acoustic properties being described as remarkable.

Springfield has devoted a great deal of attention to educational matters with the result that the school facilities of the city are not excelled by those of any other city of similar size. In addition to the regular graded schools there are the Central High School, the Technical High School and the High



SPRINGFIELD TRAFFIC CONDITIONS AND CARS. Track to side sill, 2 ft. 8 1/2 in.; side sill to trolley board, 8 ft. 9 1/8 in.; floor to headlining, 7 ft. 9 1/2 in. Track to step, 16 in.; step to platform, 14 in.; platform to floor, 10 in. Weight of car body, 20,700 lbs.



SPRINGFIELD TRAFFIC CONDITIONS AND CARS. Court Square, where suburban cars make loop. Municipal Group in background.



SPRINGFIELD TRAFFIC CONDITIONS AND CARS. Main and Carew Streets, an important traffic point. View from roof of car house.

School of Commerce, with a total enrollment of approximately 2,000 pupils.

An excellent system of parks is maintained by the city, the largest, Forest Park, comprising 476 acres, being situated at the southern limits of the city, with ample street railway facilities.

As the map, which accompanies this article shows, Springfield is exceptionally well planned for street-railway service. As a rule, the streets are fairly wide and are, for the most part, laid out on a rectangular plan. Excellent service is provided by the Springfield Street Railway Company, whose lines also connect a number of thriving suburban towns with the city, serving in all a population of approximately 200,000.

The city is what is generally known as a "one-way town." Main street is the principal thoroughfare and practically all cars touch this street at some point.

Most of the suburban cars make a loop around Court Square, where the Municipal Group of buildings is located. The railway company maintains a frequent and very ef-

ficient schedule, with 176 cars available for maximum daily service during the rush-hour periods from 7.00 to 8.00 o'clock in the morning and from 5.00 to 7.00 o'clock in the evening. During these hours, 204 cars pass any given point in the business section of Main Street. The railway maintains a liberal transfer policy and, during the fiscal year ending

June 30, 1913, carried 40,326,614 revenue and 6,796,091 transfer passengers over a total car mileage of 7,498,926 miles. The number of cars used for normal daily service in the city averages 104.

The system comprises 171.77 miles of standard gage track, of which approximately 33 miles are double track, the single track being used principally on the subur-



SPRINGFIELD TRAFFIC CONDITIONS AND CARS. Main Street at the intersection of State, through which cars for Worcester run

ban lines. The radius of the shortest curve on the system is 35 ft., and the maximum grade is 9 per cent. The company does considerable express and freight business, the express car mileage during the fiscal year ending June 30 last being 66,406, while the freight car mileage was 434.

In addition to a number of special purpose cars, and an efficient equipment of snow-fighting apparatus, among which are 36 snow plows, the railway uses several types of double and single-truck passenger cars. The standard city car, however, is that shown in the illustration, a 28-ft., double-truck, pay-inside car, with longitudinal seats. These cars have wooden underframes, properly reinforced. The body framing also is of wood, and the roof is of the monitor deck type, with pivoted ventilator sashes. Round-end vestibules, with single, two-leaf folding doors, enclose the platforms, which are separated from the body of the car by bulkheads in which are set mutually operating, double, sliding doors. The windows are of the double-sash type, with stationary upper sashes

and lower sashes arranged to raise. The interior is handsomely finished in mahogany with marquetry ornamentation, and the longitudinal seats are upholstered in rattan.

In addition to the city and suburban service, the railway company has interurban lines connecting several smaller manufacturing towns with the city. As a rule, a half-hourly service is maintained throughout the day between Springfield and Chicopee, Chicopee Falls, Holyoke and Worcester and there are two lines of cars running at 30-minute intervals during the daytime between Springfield and Hartford. These cars start at Court Square in Springfield and, making regular stops at the intermediate towns and villages, are very well patronized. The special purpose cars referred to in the preceding paragraph, include a drawing-room car which may be chartered for occasional private use, the usual service equipment and a sufficient number of express and freight cars to care for the company's business of this character. These last are of the usual type.

It is good practice to paint car floors at least three times a year. The frequent application of paint makes it necessary to use a very thin mixture. For this purpose a good mixture is about eight gallons of Japan oil to 60 pounds of red or any oxide, ground in oil, or the same proportion of Japan oil to 100 pounds of white lead. The mixture forms a powerful antiseptic and will dry in five or six hours.

Semi-Steel Cars for Dubuque

Union Electric Company



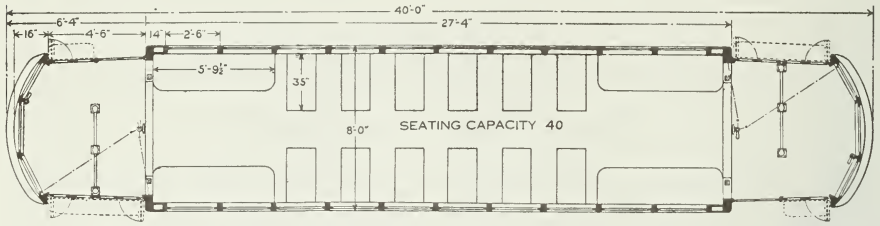
FEW weeks ago the American Car Company completed the delivery of a number of semi-steel cars, built for the Union Electric Company, Dubuque, Iowa. The cars are of an extremely interesting type and were designed by E. W. Walker, general manager and purchasing agent of the railway. It was Mr. Walker's idea to produce a car that would combine light weight with symmetry of design and maximum strength and convenience. The estimated weight of the completed car body, less electrical equipment, is only 16,500 pounds, so that matter was successfully worked out, and reference to the accompanying illustrations will demonstrate that the other conditions were satisfactorily met. As a matter of fact, the weight limit

set by Mr. Walker was 20 tons, complete with trucks, while the actual shipping weight varied from 34,000 to 35,000 pounds per car.

The construction is all steel to the window sills, as the accompanying framing plan shows, the side sills of 34-in. by 5/16-in. steel plates forming also the side plating. In addition to the plate and angle reinforcement over the full length and the extra reinforcement at the bolsters, the side plates are further strengthened by the ash side posts, which act as vertical stiffeners, the whole forming a particularly strong, but light, combination. End sills are formed of 9-in. channels, and smaller channels are used as crossings. In the center of the car is an 8-in. channel, extending from end sill to end sill. This runs through the bolsters, which



SEMI-STEEL CARS FOR DUBUQUE. The car is mounted on Brill No. 39-E single-motor trucks, suited to all-around city service.



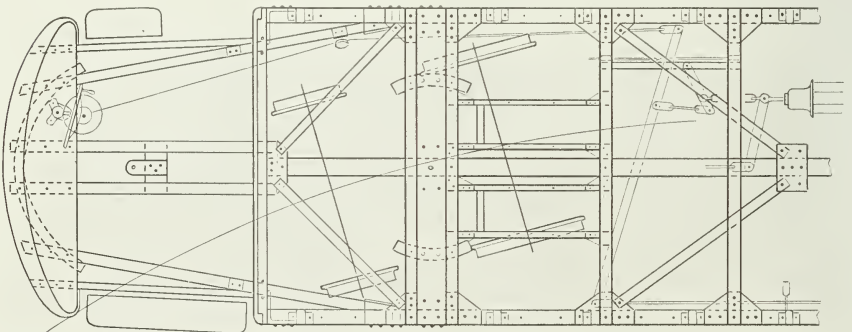
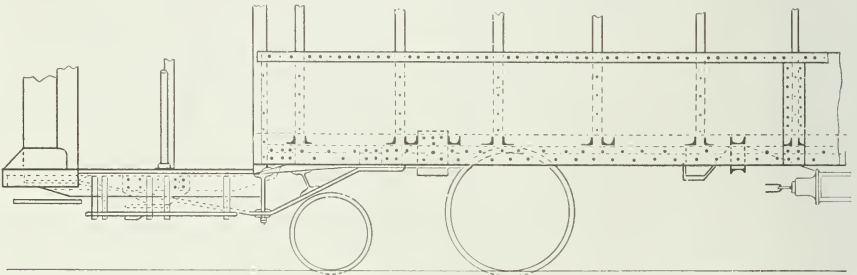
SEMI-STEEL CARS FOR DUBUQUE. Track to side sill, 2 ft. 8 3/4 in.; side sill to trolley board, 8 ft. 8 3/4 in.; floor to headlining, 7 ft. 8 1/2 in. Track to step, 16 in.; step to platform, 14 1/2 in.; platform to floor, 9 1/2 in. Weight of car body, less electrical equipment, 16,500 lbs.

are of truss form, and forms a tie for the drawbar knees and a support for the crossings.

Ash carlines, with steel carlines between, support the plain arch roof, which is fitted with eight Brill "Exhaust" Ventilators. The windows are of the double sash type, with the stationary upper sashes set in one continuous frame,

which adds considerable to the strength of construction. The lower sashes are arranged to raise to the lower edge of the upper sashes.

The interior of the car is finished in cherry, with a composition head-lining painted a harmonizing tone. There are longitudinal and transverse seats, the



SEMI-STEEL CARS FOR DUBUQUE. Plan of bottom framing, showing steel side plate and center stringer

latter being of the Brill "Winner" type, upholstered in rattan. No doors are set in the end bulkhead openings, but, instead, galvanized pipe stanchions are used in the manner shown in the illustration.

Round-end vestibules have three drop windows in front. Single,

back upon themselves. All doors are operated in conjunction with folding steps by means of mechanism controlled by the conductor and motorman.

The Union Electric Company operates over about 20 miles of track, serving a population of



SEMI-STEEL CARS FOR DUBUQUE Arrangement of pipe stanchions separates incoming and outgoing passengers and screens motorman.

two-leaf, folding doors are set on the brakestaff side of the vestibules and are used for purposes of exit only. On the controller side are four doors, each in two sections, the sections being arranged to fold

somewhat over 50,000. It owns Union Park, 83 acres, and Nutwood Park, 73 acres, and also reaches Eagle Point Park. It also furnishes light and power for DuBuque and East DuBuque.

Of 51 types of electric cars, passenger, baggage and express, described in BRILL MAGAZINE during 1913, 15 had steel underframes and 34 were built with the plain arch roof.

Center Entrance Type for Perth, Western Australia

Brill No. 27-GE1 Trucks



VERY interesting type of car, similar in a number of respects to the Washington Center Entrance Car, was recently built by The J. G. Brill Company for the Perth Electric Tramways, Limited, Perth, Western Australia, the order being placed through the J. G. White Company, London.

In the present order, the underframe, which is of the composite type, as shown in the accompanying diagram, is depressed at the center to form a center platform having a passenger compartment at either end. Each of these compartments has $3\frac{7}{8}$ by $7\frac{3}{4}$ -in. side sills extending from the center platform to the end of the car body and reinforced by a 15-in. steel

plate. Directly inside the side sills, and at a point about 3 ft. from the center platform, are 6-in. channels bolted to the side sills and extending across the center platform, where they are reinforced by a 10-in. plate which is gusseted to the side plates. These channels, with the two center stringers formed of I-beams extending from bumper to bumper, provide ample support for the center platform. End sills, crossings, diagonal braces and crown pieces are of oak. The car body is sustained on bolsters of the built-up type, with top members of wrought iron and bottom members of mild steel.

The car is sheathed to the height of the window rail with sheet steel, backed with chestnut. In the body framing, the top rail of yellow pine



CENTER ENTRANCE TYPE FOR AUSTRALIA. The car is mounted on trucks of the Brill No. 27-GE1 type.

is strengthened by the heavy letter board which is gained into it and the posts. Composite earlines support the plain arch roof, which is fitted with Brill "Exhaust" Ventilators. Round-end vestibules at each end have three drop windows, that in the center being adjustable.

stanchions, extending from floor to door head for the purpose of separating incoming and outgoing passengers, and two similar stanchions are placed at the entrance to each compartment. Two-leaf, double, folding doors, with panels of wire glass, are operated in conjunction



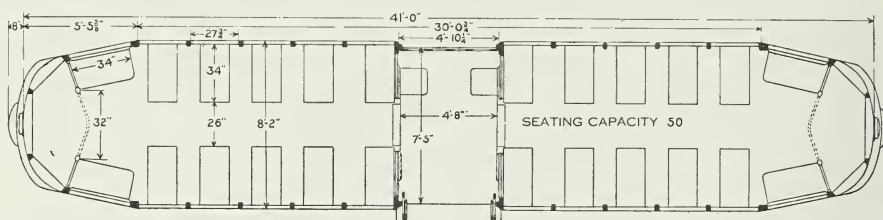
CENTER ENTRANCE TYPE FOR AUSTRALIA. Note the light, roomy interior afforded by the Semi-Convertible Window System.

Aside from these, the windows are of the Brill Semi-Convertible type, thus adding materially to the width available for aisle and seat space. All windows are provided with Brill metal sash stiles, which are a feature of the Semi-Convertible Window System and which insure easy operation.

In the center of the extreme edges of the platform are iron pipe

with folding steps, by the conductor from control stands which are placed on either side of the platform.

The interior of the car is handsomely finished in mahogany, inlaid with holly, the headlining being colored to harmonize. The longitudinal seats shown in the floor plan are rattan upholstered like the transverse seats, the latter

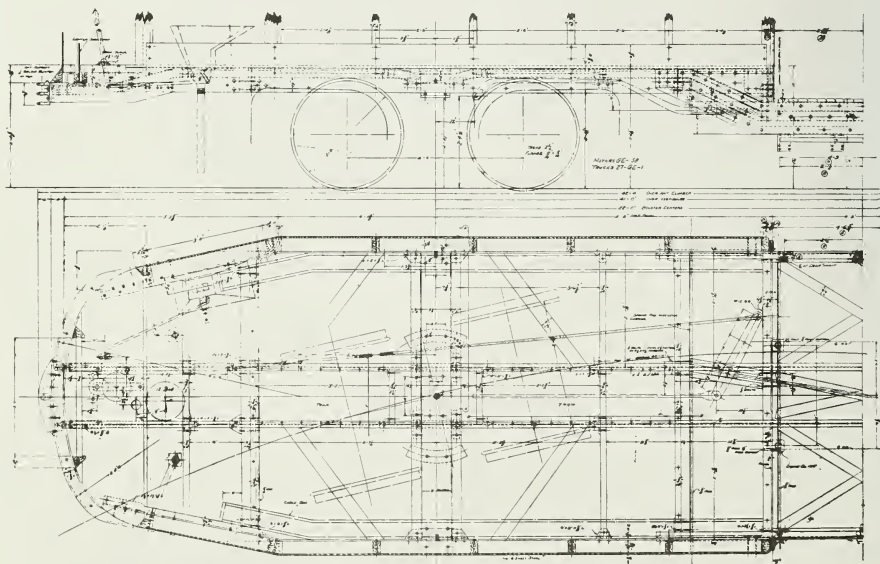


CENTER ENTRANCE TYPE FOR AUSTRALIA. Track to side sill, 2 ft. 5 1/2 in.; side sill to trolley board, 9 ft. 3 1/2 in. Track to step, 15 1/4 in.; step to platform, 13 in.; platform to floor, 10 in. Weight of car body, less electrical equipment, 16,000 lbs.

being of the Brill "Winner" type, with two stationary transverse seats on either side of the platform. The car is provided with the usual push-button system for signalling the motorman, seat-back grab-handles and hand-straps over the longitudinal seats.

Perth is the capital of Western Australia. The city is situated on the Swan River, about 1,700 miles northwest of Melbourne. The Perth Electric Tramways, Limited,

operate a route mileage of about 23 miles. The company's concession is for 35 years from December, 1904, which was the date on which the system was completed, but the local authorities reserve the right to purchase the property at the end of 21 or 28 years. The Victoria Park extension was built by local authority and leased to the company with power to purchase for the cost of construction, about £5,000.



CENTER ENTRANCE TYPE FOR AUSTRALIA. Plan of underframe showing interesting construction at center platform.

California Type for Phoenix, Arizona

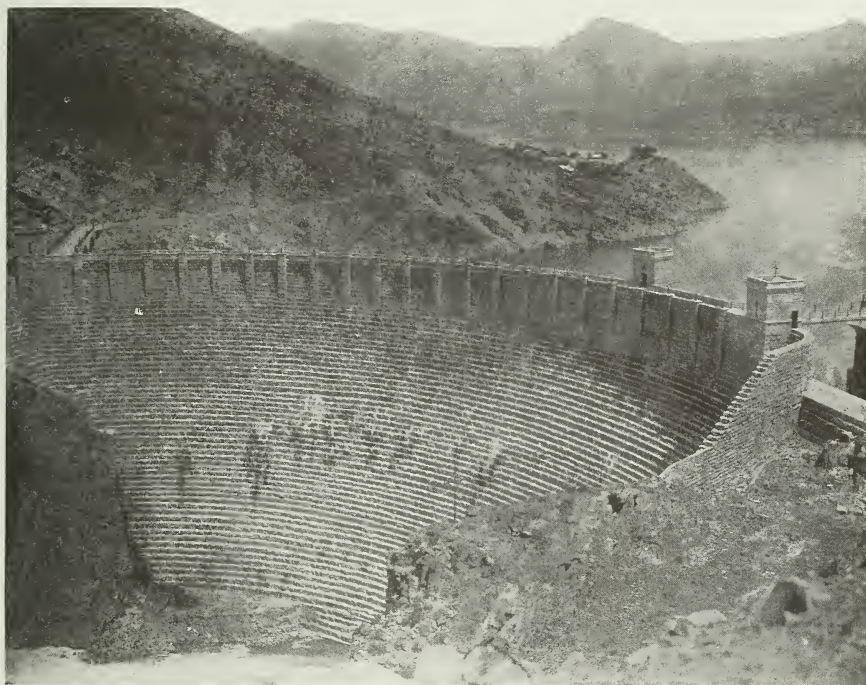
Brill No. 27-GE1 Trucks



THE Phoenix Railway Company of Arizona serves a territory to which the California type of cars, recently built for the railway by the Ameri-

a time when the open sections are at all uncomfortable.

The city is very prosperous, being situated in a section producing large crops of alfalfa, sugar beets, sugar cane, cotton and citrus fruits.



CALIFORNIA TYPE FOR PHOENIX, ARIZONA. View of the great Roosevelt Dam, where electric power for Phoenix is generated.

can Car Company, are peculiarly suited. Situated in the Salt River Valley, in the central part of Arizona, the climate is never cold and, although during the winter months an occasional cool evening makes the closed compartment preferable to some passengers, there is rarely

It is one of the most brilliantly lighted cities in the southwest, power for lighting, manufacturing and street railway operation being generated at the great Roosevelt Dam, about 80 miles to the north.

While the city proper has a population of approximately 16,000,



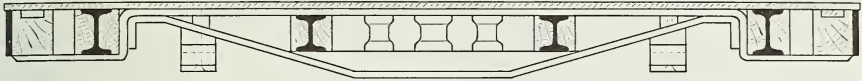
CALIFORNIA TYPE FOR PHOENIX, ARIZONA. The car is mounted on trucks of the Brill No. 27-GE1 type.

the railway company operates over about 30 miles of track and serves a surrounding territory with about 25,000 inhabitants.

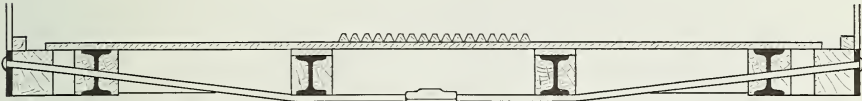
The cars involved in the present order, while extremely light, are nevertheless strongly built and fully capable of meeting any or-



CALIFORNIA TYPE FOR PHOENIX, ARIZONA. Ash rods and hand straps are provided in the closed compartment.



SECTION AT BOLSTER.



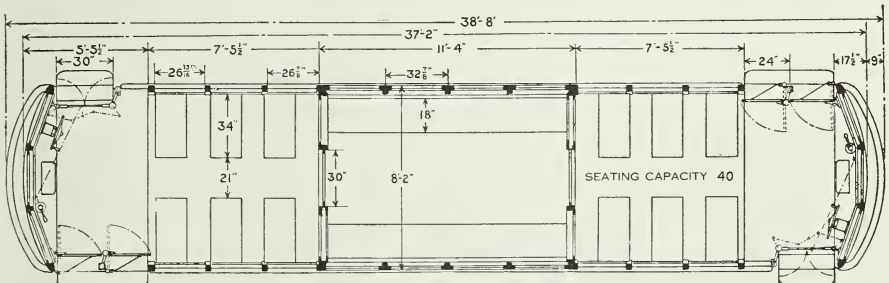
SECTION AT TRUSS ROD.

CALIFORNIA TYPE FOR PHOENIX, ARIZONA. Sectional view of underframe, showing bolster and truss rod construction.

dinary strains that may be put upon them. As the accompanying diagram indicates, the underframe construction is particularly interesting. Side sills of yellow pine extend from step to step and are plated on the outside with 5-in. by $\frac{5}{8}$ -in. steel plates, which are carried around the ends of the sills. Inside the wooden sills are 5-in. I-beams running the full length of the car and forming a part of the platform support. These I-beams are filled on both sides of the web to permit the framing in of the crossings, and are bolted through the side sills and plates, with hardwood separators at the bolts. Two center sills, formed of 4-in. I-beams, also

run the full length of the car and are likewise filled for framing in the oak crossings.

In the body framing, the posts are of ash, those at the vestibule corners being 5 in. thick. All posts are grooved for curtains which, in the open sections, are arranged to reach the floor. The roof is of the monitor deck type, with pivoted ventilator sashes, and is supported on ash carlines. At each end of the closed compartment is a bulkhead provided with a single sliding door. This compartment is finished in ash, with roof lining colored to harmonize, and is fitted with longitudinal seats of ash slats. The arched top windows have stationary upper sashes and lower sashes ar-



CALIFORNIA TYPE FOR PHOENIX, ARIZONA. Track to side sill, 2 ft. $7\frac{1}{8}$ in.; side sill to trolley board, 8 ft. $11\frac{1}{8}$ in.; floor to headlining, 8 ft. $0\frac{1}{2}$ in. Track to step, $12\frac{1}{2}$ in.; two steps each $12\frac{1}{2}$ in. to floor. Estimated weight of car body, less electrical equipment, 8,000 lbs.



CALIFORNIA TYPE FOR PHOENIX, ARIZONA. The State Capitol is one of the show places of Phoenix

ranged to drop into wall pockets.

The seats in the open sections are of the Brill "Winner" type, and are made of alternate light and dark ash slats. On either side of

the car, and running the full length of the open sections, are wire mesh screens topped by a wooden rail. The platforms are provided with folding gates.

What are called "local conditions"—distribution of population, extent of commercial district, location of industrial works, layout and width of streets, volume of vehicular traffic, topography, climate and social characteristics—doubtless influence to some extent the features of street cars. But, after all, the main questions—seating and standing capacity, location and operation of entrances and exits and method of fare collection—are determined by the average length of passenger trip, average number of stops per mile, maximum safety, cost of operation and maintenance.

Semi-Convertible Cars for Service in Connecticut

Shore Line Electric Railway



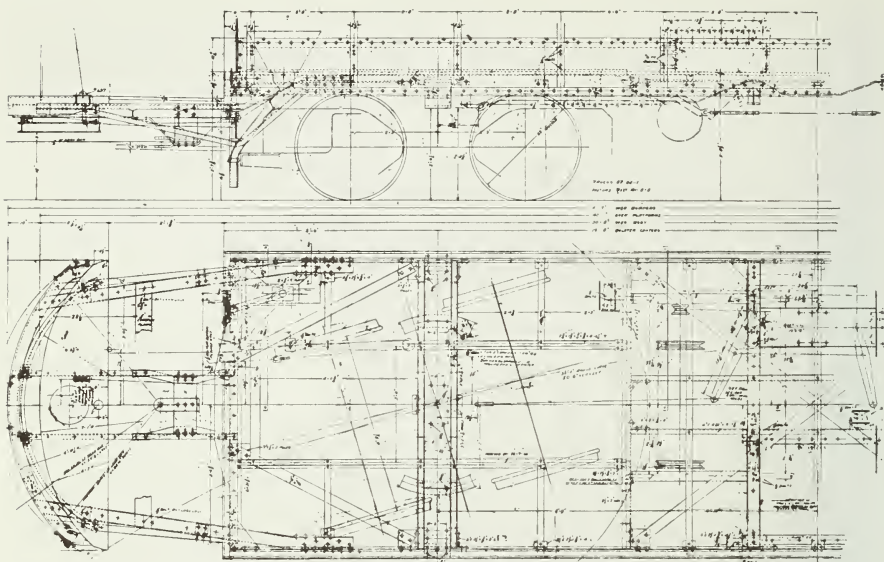
SHORT time ago, the Wason Manufacturing Company delivered to the Shore Line Electric Railway Company, Saybrook, Connecticut, a number of steel underframe cars of an interesting type. The cars are intended for interurban service on the railway company's lines, which connect New Haven with a number of surrounding towns and vil-

lages, the operating territory comprising upward of 50 miles of track and drawing from an extensive population.

These cars, as the illustration shows, are mounted on the powerful Brill No. 27-MCB1 trucks, which are especially adapted to interurban service and which are fully described in the Brill Truck Catalog, No. 206. As stated above, the underframe construction is of



SEMI-CONVERTIBLE CARS FOR CONNECTICUT. Bulkheads at each end are provided with mutually-operating, double, sliding doors.

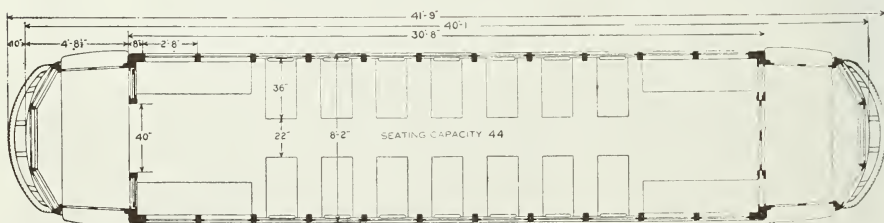


SEMI-CONVERTIBLE CARS FOR CONNECTICUT. Plan of underframe showing construction of skeleton supports for platform.

steel, the side sills being formed of 18-in. by $\frac{3}{4}$ -in. plates, reinforced with plates and angles. End sills are of 10-in. channel steel, and channels of various appropriate dimensions are used also in the construction of center stringers and crossings. There are four of the latter, two of which are made in truss form, with 4-in. channel for the top chord and a 4-in. by $\frac{3}{8}$ -in. steel plate for the bottom member.

These are dropped at the center in order to pass underneath the center stringers. As will be noted in the accompanying framing plan, the construction of the platform supports is interesting, consisting of two center knees formed of 4-in. channels, which extend from end sill to bumper, and two skeleton knees, formed of two 4-in. channels arranged as a truss support.

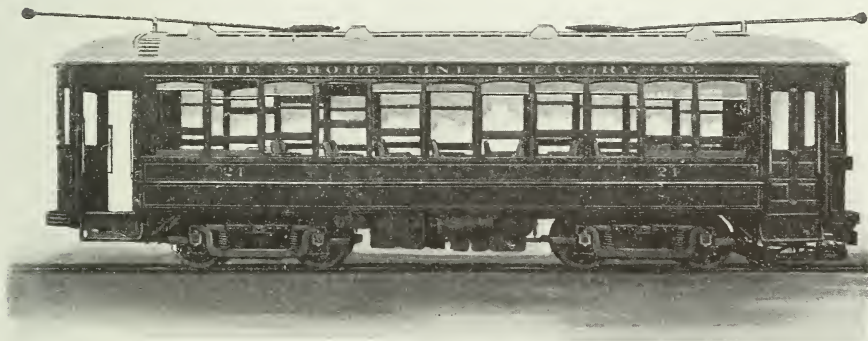
The body framing is of ash and



SEMI-CONVERTIBLE CARS FOR CONNECTICUT. Track to side sill, 2 ft. 8 $\frac{1}{2}$ in.; side sill to trolley board, 9 ft. 0 $\frac{1}{2}$ in.; floor to headlining, 8 ft. 2 $\frac{1}{2}$ in. Track to step, 16 $\frac{1}{2}$ in.; step to platform, 15 in.; platform to floor, 8 $\frac{1}{4}$ in. Weight of car body, less electrical equipment, 23,800 lbs.

yellow pine, and the posts have a sweep of $1\frac{3}{4}$ in. The roof is of the plain arch type and is provided with eight Brill "Exhaust" Ventilators. Platforms are enclosed in round-end vestibules, fitted with three windows, that in the center being adjustable, while those at the sides are arranged to drop. Brill automatic platform

Cherry is used for the interior finish, with ceilings of birch veneer. The transverse seats are of the Brill "Winner" type and, like the longitudinal seats, are upholstered with woven rattan. The windows are of the Brill Semi-Convertible type with arched heads and metal sash stiles. The advantages of this window system in the



SEMI-CONVERTIBLE CARS FOR CONNECTICUT. Cars are mounted on Brill No. 27-MCBI trucks, especially suited to interurban service.

doors are used, and other Brill specialties employed are the ratchet brake handle, radial drawbars, signal bells, track scrapers, "Dendenda" alarm gongs and "Dumpit" sand boxes.

elimination of unsanitary wall pockets, decreased maintenance charges and increased aisle and seat width, have been detailed on many occasions and require no elaboration.

It has always been a principle of the Brill organization never to develop a product in the direction of low price for the sake of cheapness. In the working out of a design and the selection of material only the highest possible efficiency has been considered. A great and lasting success could never have been built on any other basis.



ONE-MAN NEARSIDE CARS FOR VIRGINIA. Arrangement of platform railings prevents interference between motorman and passengers.

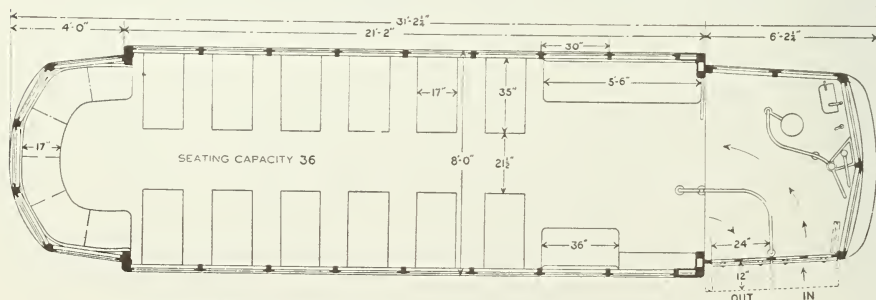
One-Man Nearside Cars for Virginia

Charlottesville & Albemarle Railway

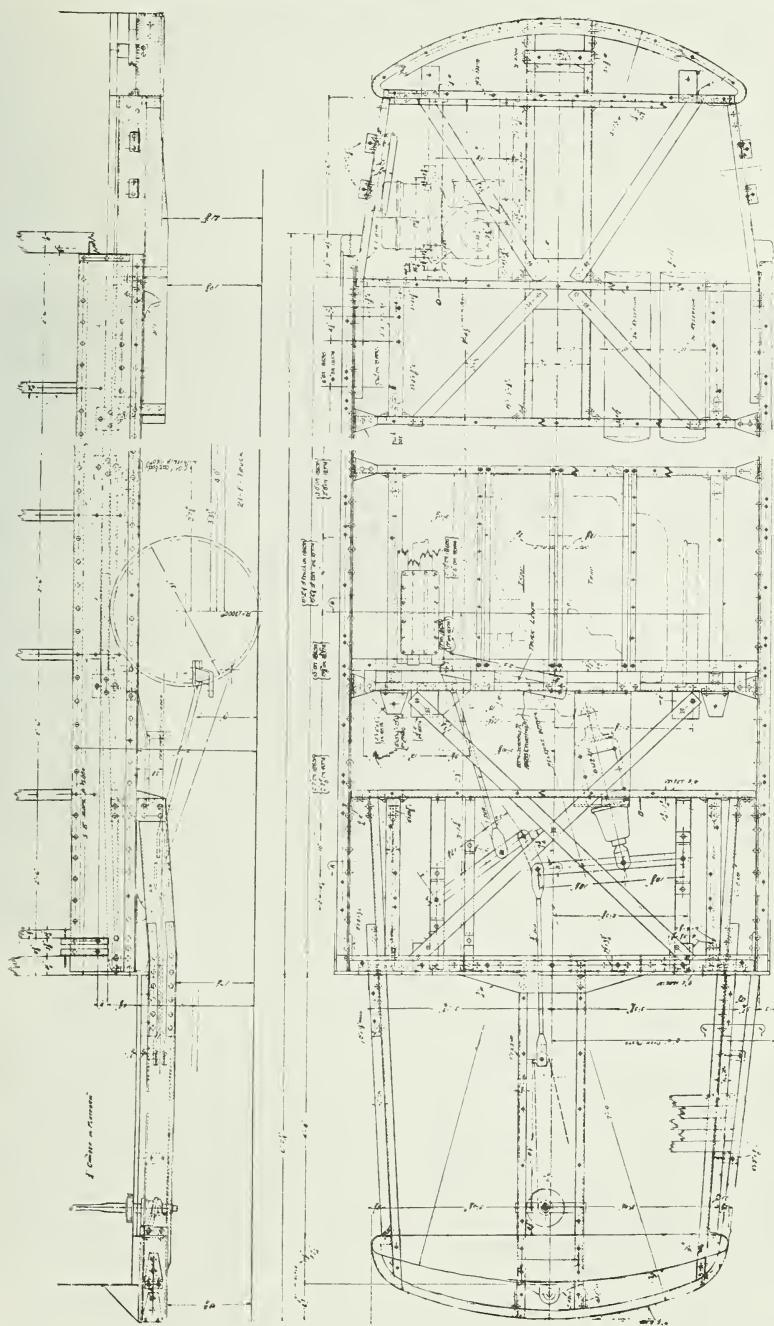
ON several railway properties, where traffic conditions permit and economy and efficiency of service demand, the operation of cars on which the motorman acts also as conductor, the one-man Nearside car, has found considerable favor. An order of cars of this type was recently shipped to the Charlottesville & Albemarle Railway

Company, Charlottesville, Va., by The J. G. Brill Company.

While these cars, as was the case with similar cars built in 1912 by The J. G. Brill Company for the Lockport, N. Y., lines of the International Railway Company, are mounted on single trucks, they embody practically all of the features of the double-truck Nearside cars. The conductor's station is, of course, omitted, permitting a pro-



ONE-MAN NEARSIDE CARS FOR VIRGINIA. Track to side sill, 2 ft. 1½ in.; side sill to trolley board, 8 ft. 0½ in.; floor to headlining, 7 ft. 7½ in. Track to step, 13 in.; step to platform, 13 in.; platform to floor, 8 ⅝ in. Weight of car body, less electrical equipment, 9,500 lbs.



ONE-MAN NEARSIDE CARS FOR VIRGINIA. Underframe plan, showing the interesting construction of platform and rear overhang supports

portionately longer longitudinal seat at the front end of the car, and, as the shorter length of the car renders unnecessary the emergency door at the rear end, this space is utilized by carrying the rear seat entirely around the rear end of the car. Otherwise the seat-

to which these parts are subject. As has been pointed out in previous articles, steel underframe construction has the advantage over wood of increased rigidity and greater resistance against cornerwise strains.

The body framing is of wood,



ONE-MAN NEARSIDE CARS FOR VIRGINIA. Two large windows in front end provide an unobstructed view for the motorman.

ing arrangement of the single and double-truck cars is identical, allowing, of course, for the difference in length.

As the diagram accompanying this description shows, the underframe of the one-man car is made up of steel plates and structural shapes, with the front platform and the rear overhang thoroughly braced against the natural strains

with the plain arch roof provided with five Brill "Exhaust" Ventilators, which are sufficient to furnish exhaust capacity considerably in excess of requirements. The cars are mounted on Brill No. 21-E trucks, having an 8-ft. wheelbase, and the Wide-Wing Journal Box, which is a feature of this type of truck, and are provided with air-brakes. This last is not usual on

single-truck cars, but it is regarded as excellent practice in the present case, as tending to increase the efficiency of the motorman-conductor.

A lengthy description of the platform and door arrangement is unnecessary, as the photographs and

diagrams show this clearly. The cars are finished inside in cherry, with oxydized trimmings, which, with the Brill Semi-Convertible Window System, give the interior a particularly bright and roomy appearance.

No one likes to be startled, except to be warned of danger, and some even resent that. The clear, sharp note of the alarm gong is the most efficient safety device on an electric car.

Short Broom Snow Sweepers

Philadelphia Rapid Transit Company

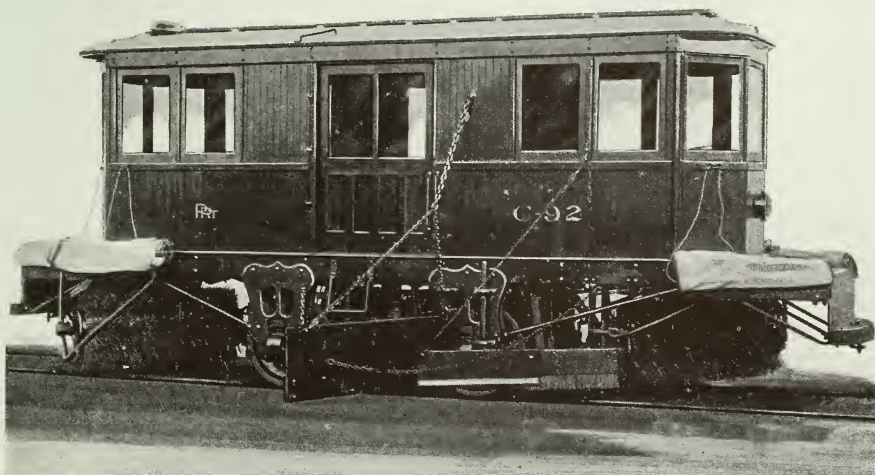


NUMBER of short broom snow sweepers, built by The J. G. Brill Company, were recently added to the

snow-fighting equipment of the

Philadelphia Rapid Transit Company. In construction, these sweepers conform in all respects to the regular Brill standard for this type.

The side sills are of yellow pine,



SHORT BROOM SNOW SWEEPERS. Track to side sills, 3 ft. 5½ in.; floor to trolley board, 6 ft. 10 in. Track to step, 27 in.; step to floor, 19¼ in. Weight of body including gear truck, but without electrical equipment, 15,400 lbs.

side plows of $\frac{1}{4}$ -in. steel plate, thoroughly braced. These are 2 ft. high, and are arranged to clear 4 ft. outside the rails when in position. Like the brooms and brush boards, they are operated from inside the cab. Front and rear aprons of heavy canvas are provided to prevent the snow from being thrown too high.

The cab is of the straight vestibuled type, with a sliding door,

fitted with stirrup step and grab handles, in the center of each side. All of the operating mechanism is located inside the cab in such positions as to allow the operator a clear view of the track at all times. The brooms are operated by means of Brill sweeper chain and sprocket gearing, from a motor-driven shaft. The sweeper is equipped with Brill "Dumpit" Sand Boxes and roof gongs.

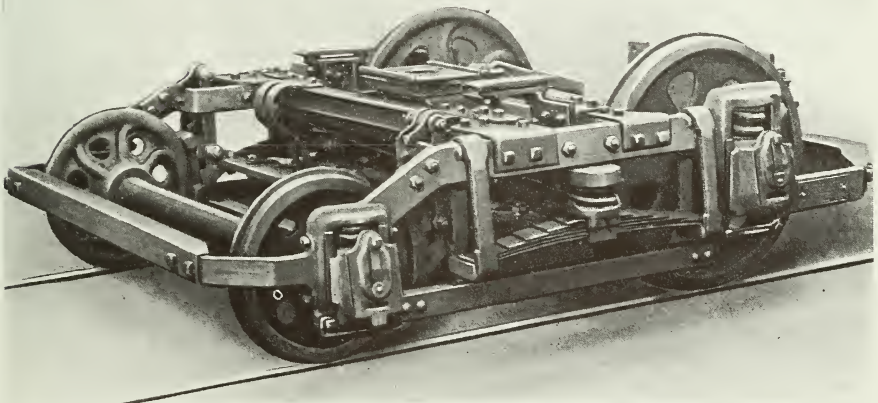
Truck side frames, solid forged by the hydraulic press process, are made nowhere in the world except at the Brill Plant.

Two Important Improvements in the Brill Single-Motor Trucks



WO highly important improvements have recently been made in the Brill Single Motor Truck No. 39-E, which cannot but be of con-

siderable interest to master mechanics and all acquainted with the mechanical features of truck construction. The improvements consist of an automatic, graduated spring system for light and heavy

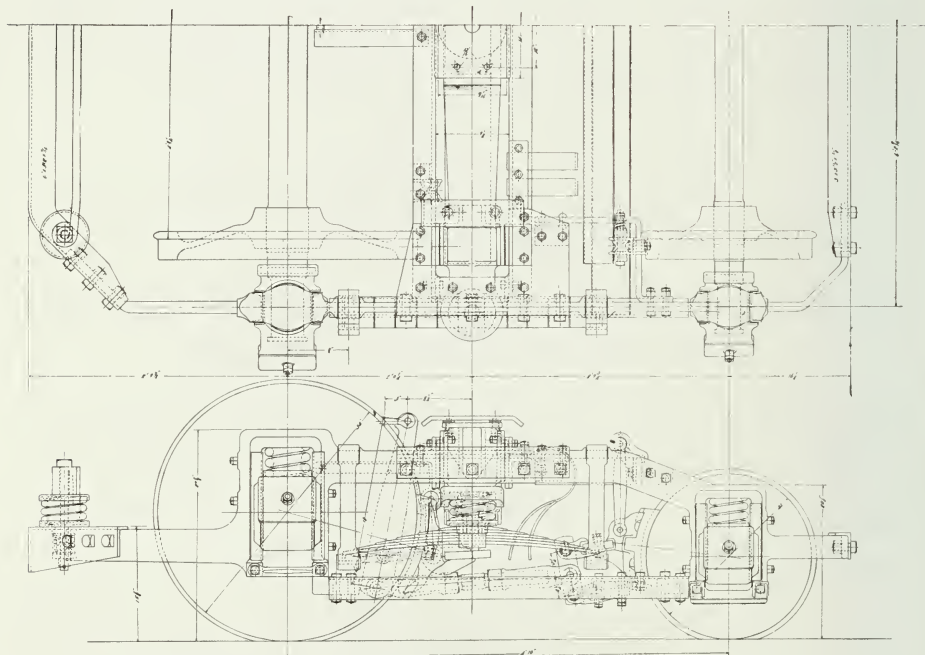


IMPROVEMENTS IN BRILL SINGLE MOTOR TRUCK. Latest type of Brill No. 39-E Truck, with the new spring system.

loads and the use of a brakebeam for the pony wheel brake shoes.

Up to the present, there has been no means of providing a soft spring arrangement on a motor truck, for carrying a car body with a light load and, as a large part of the time the car is running light, the

the small, incessant vibrations that are more harmful than the occasional heavy jolts. With the use of a single motor truck and lighter car bodies, the matter of hard riding was brought into still greater prominence, and various endeavors were made to overcome this dif-



IMPROVEMENTS IN BRILL SINGLE MOTOR TRUCK. Diagram showing spring arrangement and new brakebeam.

spring system was not suited to the load, there having been no provision for absorbing all vibrations, but merely the principal shocks. Heretofore this has been generally accepted as a necessary evil, and it has been more or less common to have a car running light more noisy than when loaded and, of course, the vibration has been uncomfortable to passengers and bad for the entire equipment, for it is

feulty, but, up to now, without the desired success.

The condition has been completely met, however, by an ingenious device recently adopted as an important part of the spring system of the Brill No. 39-E Single Motor Truck. It consists of a coil spring interposed between the bolster and the semi-elliptic spring, thus providing a soft-acting spring between the bolster and the semi-

elliptic, which latter, being a friction spring, is naturally not suited to absorbing the smaller vibrations; the whole resulting in a remarkably easy-riding truck under a light load or with the car body empty. By casting the end of the bolster to form a cap for the coil spring, and by having a seat casting arranged to come in contact with the bolster when the car body is half filled—that is, by allowing $\frac{1}{2}$ in. between the bolster and the seat casting—the semi-elliptic is brought into play for the heavier load. The coil springs are of the nested type, with an outside diameter of 6 in.

To provide for a splay of the swing links which carry the semi-elliptic on the side bars, a link is provided between the bolster and the coil spring seat casting. The combination of coil and semi-elliptic springs has been patented here and abroad. It has been widely used during the last six months, in every case meeting with remarkable success.

In regard to the brakebeam: There has long been an endeavor to devise a thoroughly satisfactory arrangement for the pony wheels of a single motor truck. There was no difficulty in providing a brakebeam for the driving wheels in this class of truck and the beam has always been used for these wheels. The pony wheels, however, being of small diameter, with the

brake shoes carried low, made it quite a problem to provide a brakebeam which would not spring under the force of the pull rod.

After a series of experiments, a method of brakebeam attachment and operation was produced in which the beam is in direct line with the force. The differential lever system for exerting a proportionate pressure on each pair of wheels, according to the load each carries, has been worked out in a very simple and effectual manner, so that difficulty in the operation of the truck *in toto* has been overcome.

The connection between the two brakebeams, including the adjusting feature, is practically the same as in other Brill trucks, with the exception of the differential lever system. The center pull lever is the same as formerly. Therefore, the Brill Single Motor Truck now has a brake system which, under any conditions, will keep all four brake shoes in perfect alignment. Application for patents on this brake system have been made in the United States and foreign countries.

Both the improvements described are considered, by those who are operating trucks having these devices, as being among the most important advances made in truck construction as applied to the most largely used electric truck—the Brill Single Motor Truck No. 39-E.

As late as 1905 there was no such thing as a satisfactory power sprinkler car in the electric railway field.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and in literature. For such purposes the copyright is waived.

Not alone is it necessary for a man to do the work laid out for him to the best of his ability. The company pays for that and is entitled to full value.

But the company wants—and must have—men who are fitted for better things—men who, by thought, application and perseverance, demonstrate their ability to move up.

That dissatisfaction which moves a man to efforts to better his position is a good thing—is the only kind of dissatisfaction that can be tolerated. The man who, by his own efforts, grows too big for his position will find a bigger position waiting for him.

There have been men who, in a short time, have grown out of their positions into bigger ones. But such cases are rare and are due to unusual conditions. The man who, by an unbroken record for hard and thoughtful work and honesty of purpose, gradually proves his worth is the man who is bound to rise. And such a rise is worth while.

No set rules can be laid down by which a man may rise above his position. Every man in the company's employ knows what he has to do and how it must be done. It rests with the individual to find, if possible, a better way of doing what he has to do, thereby gaining time to do things not strictly required of him.

This may read like a sermon, but it is not. It is just plain, common sense—a mere outline of the means whereby the big men have risen to where they are. It may sound like a demand for work for which no payment is made, but that is very far from the truth. There will be ample payment in the consciousness of work well done, of knowledge gained and, in time, of the attainment of a better position.

And payment of this character—that is, the attainment of knowledge and experience and the easy mind gained by knowing your work is well done—is, to the right-thinking man, the finest kind of return for labor. True, it will not pay rent, but it will result in a peace of mind that no money can buy and will eventually lead to money that will provide more material things. It costs but a little effort to try, and the effort is worth while.

Time

TOO many men divide their working hours into what they call their "own time" and "the company's time." Stop and think. Did you ever hear the big men—the men who have gotten somewhere—speak of "their own time?"

Payment

SOONER or later everyone in the world will, as the saying is, get his. And it rests entirely with the individual what "his" will be. The reward—the payment—for good or bad work will be that which it deserves. This is not a sermon; just plain business sense. Think it over.

Service

THE thought prevails with some men that all this talk of Service is a new idea—something to be tried out to see if it will work. It isn't. Since work and business were invented the fundamental principle has been service. Those who rendered service succeeded; those who did not failed—or lost their jobs.

Profanity

STRONG language—the polite term for profanity—is by no means a demonstration of strong character. Quite the reverse, in fact. It never does any good to give another person a "cussing out." For the time being, it may relieve your feelings, but you will be sorry when you cool off, and the other man will be sore. Remember this the next time a truck gets in front of your car.

Money

THE object of work is to provide money for living expenses, a little for pleasure and some for the conservation of old age—for the rainy day that, sooner or later, is sure to come. The way to provide for that time is to save now. The man whose wages are spent as soon as, or, as is often the case, before they are received, is the man who, in his old age, becomes a public charge—a pauper—or whose family become dependent upon charity in event of his death. A good time is all right and proper in its place and within proper limits—it is an occasional necessity—but nothing should interfere with the regular saving of a certain sum against the time when it will be badly needed.

Brill Magazine Binders

AS announced in the December issue, the 1914 binders for BRILL MAGAZINE are ready for distribution. A recent canvass of the mailing list showed that a remarkably flattering proportion of those who receive the publication, preserve complete files for reference. The new binders will be sent on request. Please address The J. G. Brill Company, Publicity Department, Philadelphia.

Brill Magazine Index

ATTENTION is called to the index to Volume VII of BRILL MAGAZINE on page 383 of the December issue. This style was adopted in 1910, and is believed to be as complete an index as can be devised. Not only does it give the type of car, but it states whether the car is of all steel, semi-steel or wooden construction, and whether it is mounted on single or double trucks. All of this information is contained on a single page and is available at a glance.

Brill Advertisements

THERE is being run at present, in the *Electric Railway Journal*, a series of Brill advertisements to which special attention is directed. In the illustrations accompanying the advertisements there appears always one particular character, which will be carried through the entire series. The illustrations are done in outline with the exception of the faces of the characters and the parts to which it is desired to call particular attention. These are done in wash, and the whole makes a combination never before attempted in advertising of this character.

The December Brill Magazine

THE last issue of BRILL MAGAZINE, as undoubtedly was noticed, was devoted entirely to descriptions of cars built for foreign countries. It had been the intention to publish this foreign issue several months ago, but other matters intervened. In the future, however, such an issue will appear at intervals and will without doubt be of much interest, as, in many instances, the types of cars built for foreign countries differ materially from those built for railways in the United States. In this connection, it is interesting to note that of upward of 7,000 copies of BRILL MAGAZINE circulated each month, about 2,300 go abroad.

The J. G. Brill Company

Main Office
Philadelphia, U. S. A.

Cable Address: "BRILL," Philadelphia

London Office: 110 Cannon Street, E.C.

Cable Address: "AXLES," London

American Car Company, St. Louis, Mo.
G. C. Kuhlman Car Co., Cleveland, Ohio
John Stephenson Co., Elizabeth, N. J.
Wason Manuf'g Co., Springfield, Mass.

Cie. J. G. Brill, 49 Rue des Mathurins, Paris

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Australasia

NOYES BROTHERS, Melbourne, Sid-
ney, Dunedin, Brisbane, Perth

Belgium & Holland

C. DUBBELMAN, 24 Place de Lou-
vain, Brussels

Argentine & Uruguay

FEDERICO H. BAGGE, Calle San
Martin 201, Buenos Aires

Natal, Transvaal & Orange River Colony

THOMAS BARLOW & SONS, Durban,
Natal

China

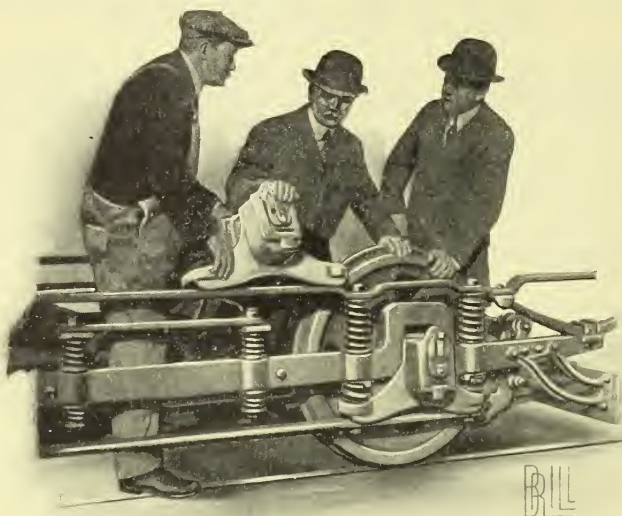
SHEWAN, TOMES & Co.
Hong Kong, Canton, Shanghai

Italy

GIOVANNI CHECCHETTI
Piazza Sicilia, 1, Milan

If you change your address

write the new address on the envelope in which this
magazine is received and return the envelope to the
Publicity Department, The J. G. Brill Company.



THE Brill Wide Wing Journal Box is a feature of the Brill No. 21-E Truck and has the distinct advantage, over the short wing box formerly used, of increasing the spring base of the truck frame, thus allowing greater riding stability, and of reducing stress on the truck frame by supporting the frame directly under the coil springs. It is the only single-truck which, by the setting of truss pipes on the ends of the post stays, thus forming complete and substantial trusses, affords extra support for long cars. The life of the truck is doubled by the use of solid-forged side frames.

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA

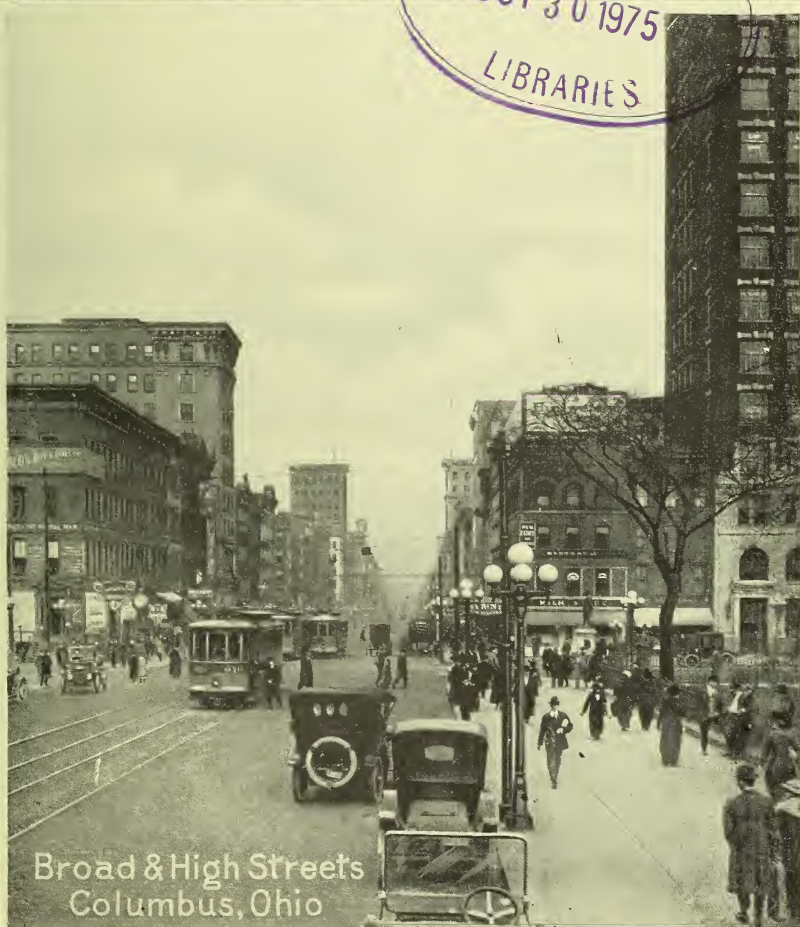
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No. 2

BRILL MAGAZINE

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Broad & High Streets
Columbus, Ohio



BRILL "NARRAGANSETT" CAR

THE Z-bar sill of the Brill "Narragansett" Car permits an arrangement which brings the step within the post line, adds materially to the strength of construction, and greatly increases the safety and convenience to passengers. These features, together with the round-cornered, metal seat-end panels, make the Brill "Narragansett" the only practical double-truck open car.



John McLean

PRESIDENT, COLUMBUS RAILWAY, POWER & LIGHT COMPANY

Dependability

To be dependable—to be singled out as one who accomplishes things—is a tremendous asset.

A man may be faithful or industrious or even capable, and still not be dependable.

For the faithful man may be incompetent, he who is capable may possess erratic tendencies which minimize his efforts, and the industrious man may be a blunderer.

But the dependable man is he who can at all times be depended upon to do that which is set for him to do, as it should be done.

He has learned by experience how not to do things, and with this has come naturally the knowledge of how things should be done.

Like every other quality, dependability can be acquired. Like everything else that is desirable, its acquisition requires effort. But the reward is worth the struggle.

Volume
Eight

Brill Magazine

Number
Two

February 15, 1914

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Samuel G. McMeen



AMUEL G. McMEEN, now connected with certain enterprises under the influence of E. W. Clark & Company, of Philadelphia, was born in Eugene, Indiana, November 28, 1864. Following a limited course in Purdue University,

he entered the telephone business. For about twenty years he was in the Bell Telephone service, in commercial and technical branches, being for a time in the engineering department of the Western Electric Company, and for about six years chief engineer of the Central Union Telephone Company, an "Associated Bell" company, with headquarters in Chicago.

In 1904, with Kempster B. Miller, Mr. McMeen formed the firm of McMeen & Miller, electrical and mechanical engineers, Chicago. This partnership changed from a firm to a corporation in 1913, continuing its name as before.

Certain of the activities of E. W. Clark & Company, bankers, are cared for by the E. W. Clark & Company Management Corporation, of which C. M. Clark is president, and M. S. Hopkins and S. G. McMeen are vice-presidents.

Upon the reorganization and combination of interests of the electric railway, lighting and power companies in Columbus, Ohio, Mr. McMeen was elected president of the Columbus Railway, Power & Light Company. He is also president of the East St. Louis & Suburban Railway Company, the East St. Louis Light & Power Company, and the East St. Louis Railway Company, all of East St. Louis, Illinois, and is vice-president of McMeen & Miller, Incorporated. He is a Fellow of the American Institute of Electrical Engineers, Member of the American Society of Mechanical Engineers, the Western Society of Engineers, and of sundry clubs. His home is in Columbus, Ohio.

Conditions Which Govern the Type of Car for City Service

Columbus, Ohio

THE capital of the State of Ohio and the county seat of Franklin County, Columbus is one of the leading cities of that part of the country, and is enjoying a steady growth both in population and commercial importance. It lies near the geographical center of the State, at the junction of the Scioto and Olentangy Rivers, being about 120 miles northeast of Cincinnati and 138 miles southwest of Cleveland.

It was in 1797 that the first permanent settlement of what is now Columbus was made on the west bank of the Scioto River. The little hamlet was called Franklinton and was made the county seat in 1803. In 1812, after considerable agitation, the capital was brought there and located on a tract known as the Borough of Columbus, on the east bank of the Scioto. The legislature first met there in 1816, when the settlement was incorporated. Considerable impetus was given by the completion of the Columbus branch of the Ohio Canal in 1831, and by 1834 the borough had grown sufficiently to warrant its incorporation as a city.

Since then the growth of the city in area, population and commerce has been steady. Today the municipality covers an area of approximately 17 square miles and the

number of inhabitants is reliably estimated at 210,000, including a large and thrifty foreign-born element. The principal portion of the city lies on an extensive plain along the east bank of the river.

For the most part, the streets follow a rectangular plan and are quite broad. The principal business thoroughfare, High Street, several sections of which are shown in the illustrations which accompany this article, is 100 feet wide, and Broad Street, on which are located many of the finest residences, has a width of 120 feet.

Columbus is an important railroad center, the ample shipping facilities giving great stimulus to manufacturing industries, of which there are a great many of widely diversified character in and around the city. These include foundries and machine shops, boot and shoe and wagon and carriage factories, patent medicine concerns and breweries. Immediately outside the city limits there are extensive railroad shops, brickyards, ice plants and slaughter houses, while nearby are several large quarries. Being located near the Ohio coal and iron fields, the city naturally enjoys a large trade in these products. According to the 1910 census, the city's manufactures amounted to \$49,031,872, an increase of over 20 per cent. in five years.

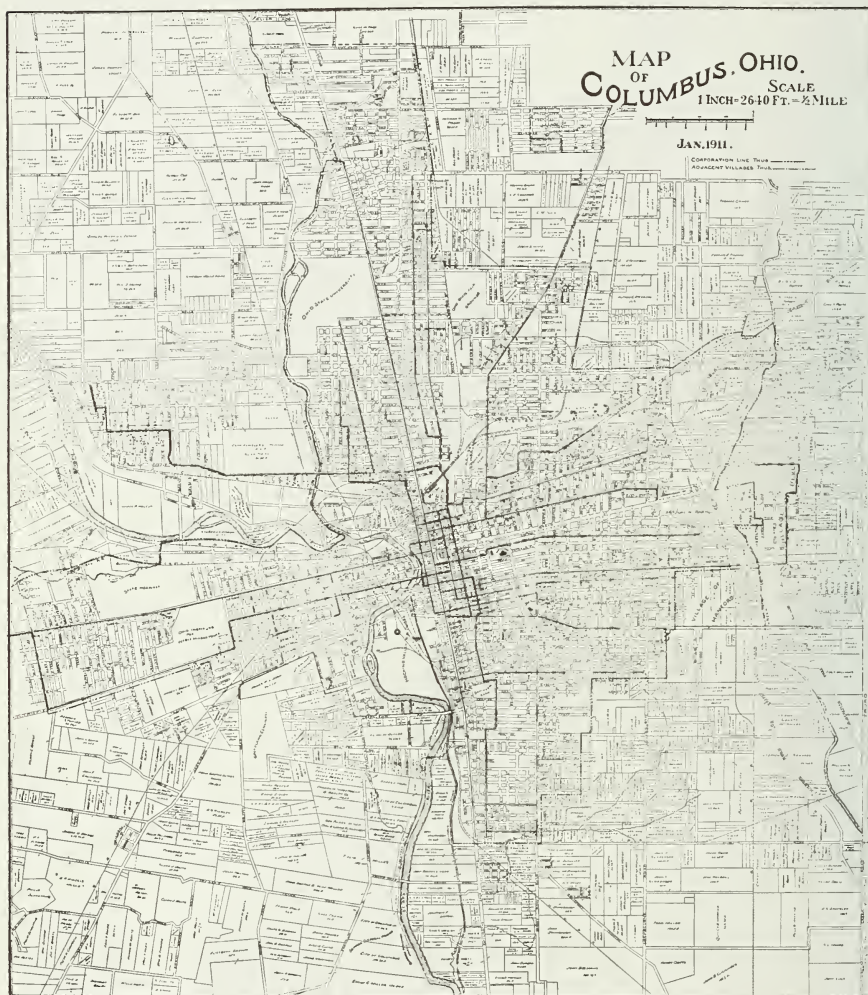


COLUMBUS TRAFFIC CONDITIONS AND CARS. Long and High Streets. View showing conditions in non-rush hours



COLUMBUS TRAFFIC CONDITIONS AND CARS. High Street, showing point where Goodale Street cars turn off

Columbus contains a number of parks, which, although not large as such things go, are nevertheless and Minerva Parks are well equipped as amusement resorts, as is also Indianola Park on the oppo-



COLUMBUS TRAFFIC CONDITIONS AND CARS. Reduced to single-track basis, the railway covers 127.226 miles of track

admirably planned and located to the best advantage for public use. The principal ones are Franklin, with 90 acres, Goodale, 44 acres, and Schiller, 24 acres. Olentangy

site side of the river. The United States Army post occupies 80 acres and the State Fair Grounds embrace 110 acres.

Columbus is the center of a wide

interurban territory which is adequately served by several electric lines. The city service proper is supplied by the Columbus Railway, Power & Light Company, and it will be seen by the map which accompanies this article that the com-

curve on the lines is 31 ft. 4 $\frac{7}{8}$ in.

As High Street is the principal thoroughfare, most of the cars touch it at some point. The business section of this street is confined to a comparatively few blocks, which naturally results in more or



COLUMBUS TRAFFIC CONDITIONS AND CARS. High and Town Streets, an important point in the retail district

pany's lines cover the city in a very thorough manner. In all, the railway operates over 54.855 miles of double and 17.516 miles of single track, of 5 ft. 2 in. and 4 ft. 8 in. gage. The fact that the city lies principally on the plain previously referred to, is a distinct advantage, as the maximum grade is only 2.94 per cent. The radius of the shortest

less congestion during the rush hours, but the service is fully adequate for the requirements. The busiest traffic point on the system is at the junction of High and Gay Streets, where an average of 113 cars, each way, pass every hour during the peak. During 1913 the railway carried 63,383,422 revenue and 16,177,218 transfer passengers

BRILL MAGAZINE



COLUMBUS TRAFFIC CONDITIONS AND CARS. State and High Streets, showing portion of Capitol and grounds



COLUMBUS TRAFFIC CONDITIONS AND CARS. High and Gay Streets, point of heaviest traffic on city lines

over a total car mileage of 1,276,053. On some of the cars fare registers are used, while others are equipped with fare boxes for both cash and tickets. The company maintains a liberal transfer policy.

The railway is admirably

tions. These cars have wooden underframes, with the side sills plated with 15½ in. by ¾-in. steel plates reinforced by angles. This sill construction, together with the deep truss, is amply strong to meet any demands that may be put upon it



COLUMBUS TRAFFIC CONDITIONS AND CARS. The longitudinal seats provide ample aisle and standing room

equipped, having 238 passenger cars available for maximum daily service. The number of cars in normal daily operation is 129 during non-rush hours and 201 during the morning and afternoon peaks.

Several types of closed and open passenger cars are used, but the standard is the 28 ft. 8 in. pay-as-you-enter car, built for the railway by the G. C. Kuhlman Car Company and shown in the illustration.

and obviates the necessity of center or intermediate sills. Crossings and diagonal braces are of oak, held in place by sockets formed of channels and angles riveted to the side plates. End sills are oak plated with 6 in. by ½-in steel.

The body framing is of wood, with the monitor deck roof provided with pivoted ventilator sashes. Side and end windows are of the single sash type, arranged



COLUMBUS TRAFFIC CONDITIONS AND CARS. The cars are mounted on Brill Special No. 22-A trucks

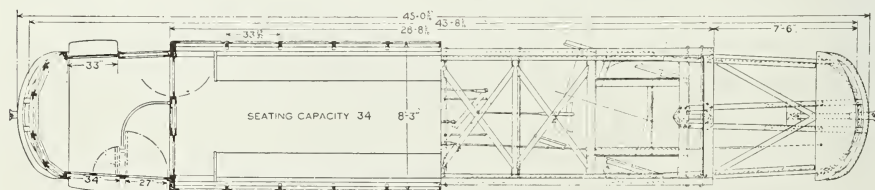
to drop into pockets. Longitudinal seats are used. The interior finish is cherry. Bulkheads at either end are fitted with two doors for entrance and exit. The former is arranged to swing both ways, while the latter slides into a pocket formed by the center section of the bulkhead. The vestibule doors are interesting, in that the entrance door is of the two-leaf type, hinged to the upright which separates incoming and outgoing passengers, while a single door, hinged to the same upright, is used for purposes of exit. Both doors swing in against the iron pipe railing forming the conductor's position. On the brakestaff side of each vestibule

is placed a single sliding exit door.

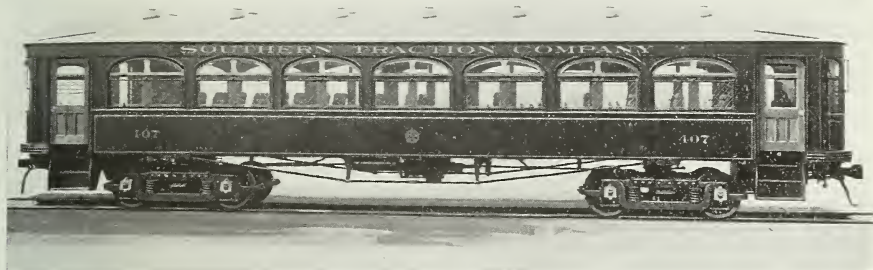
In addition to its passenger equipment, the railway company operates a 40-ft. baggage car and an adequate service equipment which includes six sweepers, four snow plows, two wrecking cars, a line car and a bond-test car.

Olentangy and Minerva Parks, two of the amusement and recreation resorts referred to in a preceding paragraph, are owned by the railway company, but are leased to the Olentangy Park Company, by which they are operated.

The company, in addition to operating the railway, furnishes electric current for commercial lighting and power.



COLUMBUS TRAFFIC CONDITIONS AND CARS. Track to side sill, 2 ft. 6½ in.; side sill to trolley board, 10 ft. 6 in.; floor to headlining, 8 ft. 2½ in. Track to step, 15½ in.; step to platform, 13½ in.; platform to floor, 7½ in. Weight of car body, less electrical equipment, 23,880 lb.



SEVERAL TYPES OF INTERURBAN CARS. The cars are mounted on Brill No. 27-MCB3-X trucks

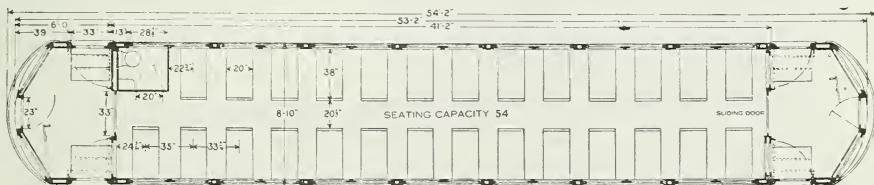
Several Very Interesting Types of Interurban Cars

Southern Traction Company

A SHORT time ago the American Car Company completed delivery to the Southern Traction Company, at Dallas, Texas, of a number of cars for use on the railway's interurban service between Dallas and Waco and Dallas and Corsicana. In addition to these cities, the company serves Hillsboro, Waxahachie, Lancaster and several smaller towns, operating over a total trackage of 151 miles. The

passenger and express cars are run in trains, usually of two cars, and the schedule calls for an hourly service of two classes, local and limited. The run of 97 miles between Dallas and Waco is made in four hours by the limited passenger trains.

The cars included in the present order are of several extremely interesting types, consisting of passenger trail cars, express motor and trail cars, a work car and a combination work and line car, the



SEVERAL TYPES OF INTERURBAN CARS. Track to side sill, 3 ft. 7 in.; side sill over roof, 9 ft. 4½ in.; floor to headlining, 8 ft. 6 in. Track to step, 16½ in.; three steps to platform, 34 in. Weight of car body, including air-brake equipment, 30,000 lb.

last two being also adaptable to heavy express and freight service.

The passenger trail cars are designed especially for high-speed interurban service in trains of two or more and are capable of operation at 60 miles an hour without excessive vibration. As the accom-

low pine, tenoned into the sills. End sills are of oak, reinforced by 4½-in. by ¼-in. U-irons, bolted to the longitudinal members, and on the underside by 3½ by 7 by ½-in. angles. Needlebeams are formed of 6-in. I-beams and the bolsters are of steel in truss form, each capable



SEVERAL TYPES OF INTERURBAN CARS. Passenger cars are fitted with seats of the Brill "Winner" type

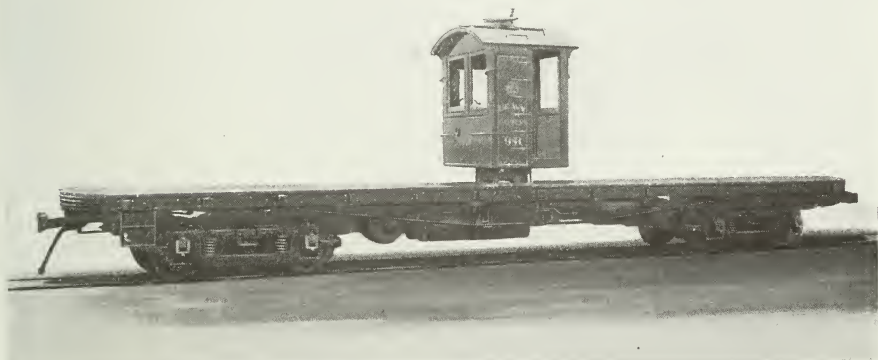
panying framing plan indicates, the underframe is of composite construction, with yellow pine side sills reinforced by 6-in. channels having inside fillers of yellow pine. Additional longitudinal members consist of two intermediate sills of yellow pine, plated with 6-in. by ⅜-in. steel plates, and two center sills formed of 6-in. I-beams with pine fillers on either side of the web. The cross framing is of yel-

of supporting a weight of 60,000 lbs.

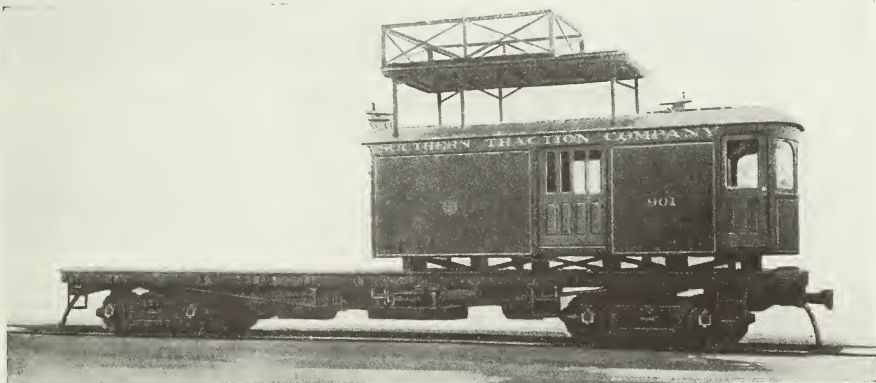
Wood is used in the body framing and each side is framed for seven pairs of double windows, the oval top sashes of which are stationary, while the lower sashes are arranged to raise. Bulkheads at each end are fitted with single sliding doors which, together with the end windows, are removable in hot weather. The interior finish is of



SEVERAL TYPES OF INTERURBAN CARS. Except for electrical equipment, express motor and trail cars are alike



SEVERAL TYPES OF INTERURBAN CARS. The work car is designed also for heavy express and freight service



SEVERAL TYPES OF INTERURBAN CARS. Roof platform on combination car can be lowered to cab roof level

oak, with a composition headlining. Toilet arrangements are provided in one corner of the car. The car is fitted with magazine racks, coat and hat hooks and the usual grab handles. Fourteen Brill "Exhaust" Ventilators are installed in the plain arch roof.

The express motor and trail cars

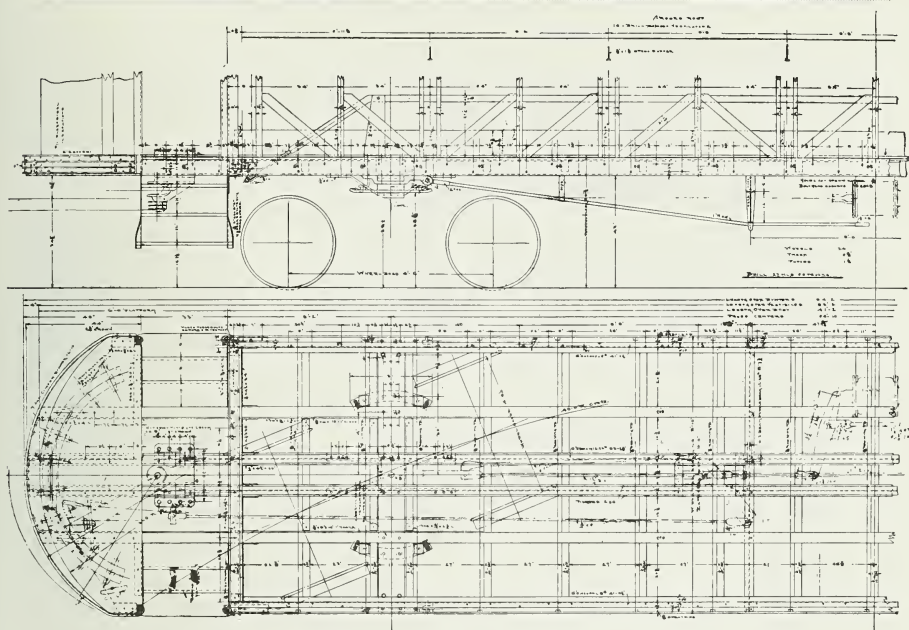
bolted together as shown in the diagram. Center sills are formed of 6-in. I-beams with yellow-pine fillers. The crownpieces and needlebeams are of oak, the former having an 8-in. by 1/2-in. steel facing. Bolsters are similar to those used in the passenger cars. The body framing is of wood. A bulkhead



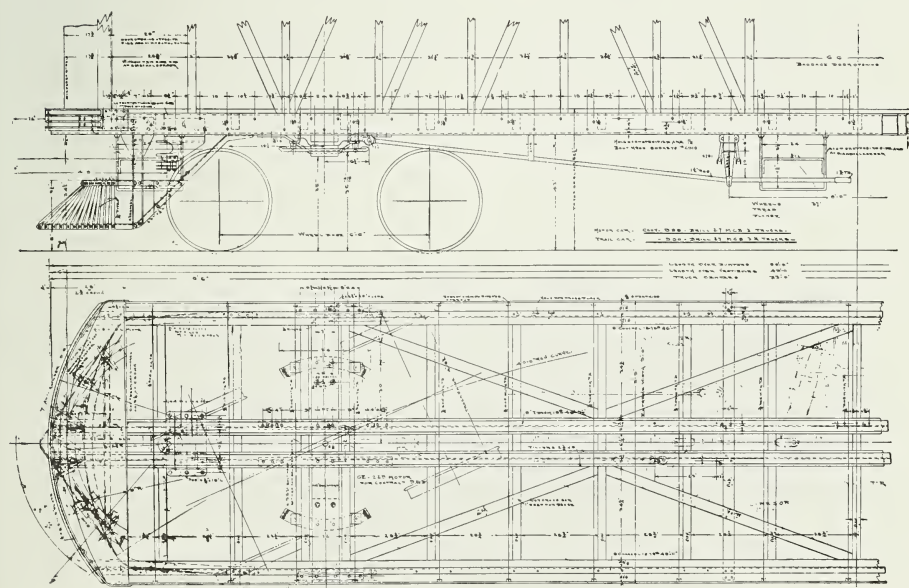
SEVERAL TYPES OF INTERURBAN CARS. Express cars are fitted with messengers' desks not shown in illustration

are practically identical in construction, excepting, of course, the electrical equipment, and are designed to carry a distributed weight of 40,000 lbs. at a speed of 60 miles an hour without racking. Side sills are formed of two sections of yellow pine, in continuous lengths, with an 8-in. steel channel between, the whole being solidly

at each end is fitted with a swing door, giving access to the motor-man's cab. There is also a swing door on the brakestaff side at each end and a wide sliding door on each side of the car in the center. There are no windows except in the vestibules, although all doors have glass panels, in the upper parts. The vertical dimensions are as fol-



SEVERAL TYPES OF INTERURBAN CARS. Framing plan of passenger car, showing upper and lower truss rods



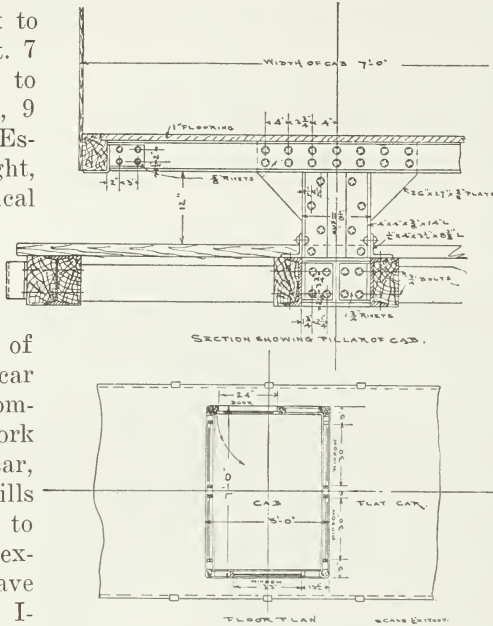
SEVERAL TYPES OF INTERURBAN CARS. Framing plan of express car, showing interesting sill construction

lows: Track to side sill, 3 ft. 7 in.; side sill to trolley board, 9 ft. 4 $\frac{1}{4}$ in. Estimated weight, less electrical equipment, 25,000 lbs.

In the under frame construction of the work car and the combination work and line car, the side sills are similar to those of the express cars, save that 8-in. I-beams are used for centers. The center sills are

of yellow pine, reinforced by 8-in. channels and the end sills and crossings are of oak, the whole being designed to carry a distributed load of 40 tons at high speed.

Covering half the length of the work and line car is a cab, the front

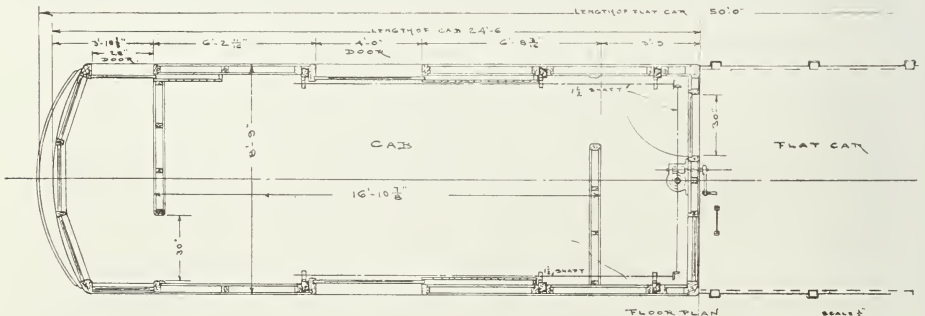


SEVERAL TYPES OF INTERURBAN CARS. Diagram showing construction of cab support on the work car

end of which is arranged in a manner similar to the express car, having a bulkhead and door between the main body of the cab and the motorman's position. On each side of the center of the cab is a sliding door, paneled in the upper part with wire glass. The cab is fitted with a roof platform capable of being raised and lowered at will by means of mechanism

located within the cab.

The cab of the work car is located in the center and clears the floor of the car in the manner shown in the accompanying diagram. The car weighs 15,000 lbs., less electrical equipment.



SEVERAL TYPES OF INTERURBAN CARS. Work and line car: Track to side sill, 3 ft. 7 in.; track to trolley board, 14 ft. 10 $\frac{1}{2}$ in.; side sill to roof of cab, 8 ft. 6 $\frac{1}{2}$ in. Estimated weight of car body, less electrical equipment, 18,000 lb.

Center-Entrance Cars for Service on the Pacific Coast

Southern Pacific Company

THE J. G. Brill Company recently completed an order of 36 cars for use on various properties controlled by the Southern Pacific Company. Of these cars, 20 are for the Pacific Electric Railway Company, Los Angeles; six for the Stockton Electric Railroad Company, six for the San José Railroads and four for the Fresno Traction Company. The illustrations accompanying this article were made from photographs of one of the San José cars, but all of the cars are identical in construction and are of an extremely interesting type.

As will be noted, the cars are of the center-entrance type, the use of which on the lower Pacific

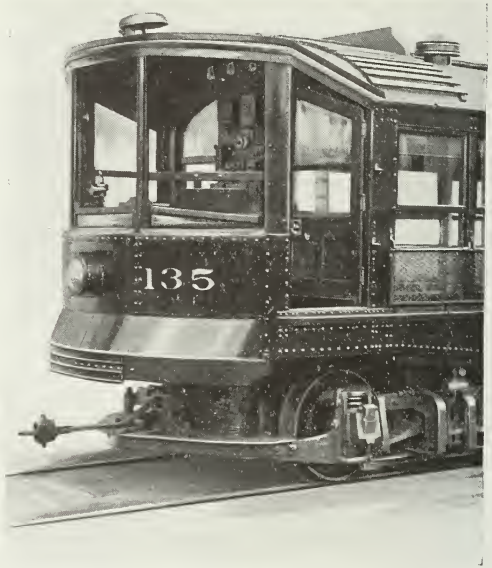
Coast is quite a departure, inasmuch as the California type has for years been the standard in many of the Coast cities, especially those in Southern California, where, in view of the climate, its combination open and closed features have made it very popular. The new cars present a very handsome appearance both inside and out, are thoroughly convenient for the near-side stops required in most California cities and will, it is believed, achieve even greater popularity with the public than the California type. This should be particularly true in the case of Los Angeles, where traffic congestion and sharp curves make a car of the new type particularly adaptable. The traffic conditions in this city were fully described in



CENTER-ENTRANCE CARS FOR PACIFIC COAST. The cars are mounted on trucks of the Brill No. 62-E type

an article in the November, 1911, issue of BRILL MAGAZINE.

The new cars have all steel underframes made up of plates and structural shapes, and the construction is most interesting, as may be observed by an examination of the frame plan which accompanies this description. Side sill and belt rail are formed of angles to which the side plate is riveted, the whole forming a girder which is broken on either side at the center doorway. The strain is carried over the doorway by means of channel sections, the top of the frame being curved to conform to the shape of the roof, which considerably increases the stiffness and resistance to compression.



CENTER-ENTRANCE CARS FOR PACIFIC COAST. Cars are provided with roof gongs at each end

Center stringers are formed of angles, and the crossings consist of 3-in. channels riveted together. The bolsters are made up of Z-bars reinforced by angles and rectangular bars. The longitudinal members extending from bolsters to end sills are formed of 3-in. Z-bars, and support the center plate, the load of the car being transmitted to the center plate partly by the bolsters and partly by a steel girder forming a bulkhead between the body of the car and the motorman's cab at each end.

The floor is supported on angles riveted to the inner side of the side girders. Side and door posts are formed of T-iron of suitable



CENTER-ENTRANCE CARS FOR PACIFIC COAST. Center doors are fitted with spring buffers

dimensions. The plain arch roof is supported on composite carlines.

The interior of the cars is very handsomely finished. Steel posts are covered with mahogany to correspond with the doors, window frames, etc.

All hinges, door handles, seat

These are stationary, and the backs are surmounted by brass grilles. Rattan-upholstered benches run around each end of the car, and the backs of these also are fitted with brass grilles which separate them from the steel bulkheads.

Center doors are air-actuated,



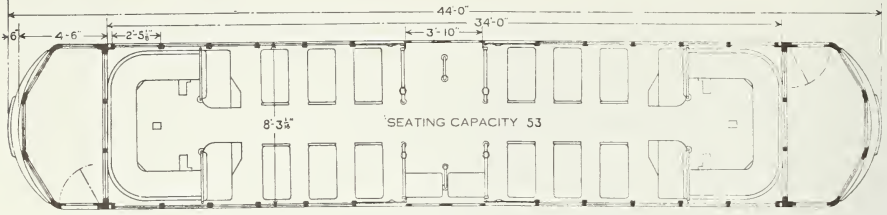
CENTER-ENTRANCE CARS FOR PACIFIC COAST. Fare register is mounted on panel in center of car

back grab-handles, window and shade fixtures and similar hardware are of solid bronze heavily nickel plated, and the pipe stanchions and railings are white enameled.

All seats are upholstered in rattan and are reversible, with the exception of one on either side of the aisle at each end.

with electric control at the conductor's position. The doors are of the double sliding type, moving on outside steel sheaves.

The conductor's position is directly opposite the entrance-exit, and is provided with a seat and footrest which may be folded back against the panels marking the doorway. In this way, the con-



CENTER-ENTRANCE CARS FOR PACIFIC COAST. Track to side sill, 10 in.; side sill to trolley board, 9 ft. 0 3/4 in.; floor to headlining, 7 ft. 10 1/4 in.; Weight of car body, less electrical equipment, 17,810 lb.

ductor is above the level of the passengers' heads and is permitted a clear view of the interior of the car.

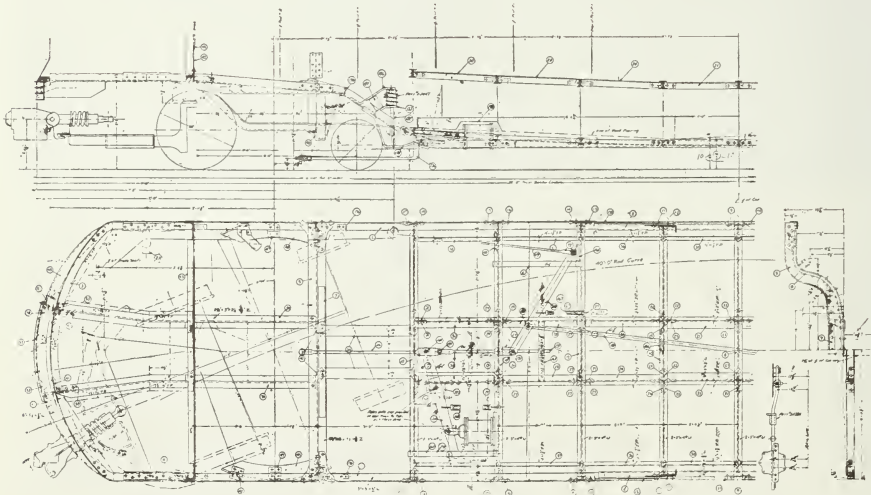
The center door connection is such that the motorman cannot receive the starting signal until all doors are closed. Windows are of the double sash type, the upper sashes being stationary, while the lower ones are arranged to raise to the height of the lower edge of the upper sash.

Wire-mesh screens are placed outside all side windows, save those on either side of the center doors. The usual push-button sig-

nal system is installed in each side post.

The motorman's cabs at either end of the car are raised above the main floor level and are completely separated from the body of the car by the steel bulkheads, in which there are two windows arranged to drop into pockets.

The cabs are provided with three front windows and one on the brakestaff side, all of which drop into pockets. On the controller side at each end is a single door which swings in against the bulkhead.



CENTER-ENTRANCE CARS FOR PACIFIC COAST. Frame plan, showing interesting platform construction

Motor and Trail Cars for Canadian City Service

Montreal Tramways Company



WITHIN the past few weeks, The J. G. Brill Company completed shipment to the Montreal Tramways Company of 25 motor car bodies and

traffic on this line is sufficiently heavy for two-car service throughout the day, thereby greatly increasing the earning capacity of the trailers, there being no occasion for time lost in making up trains,

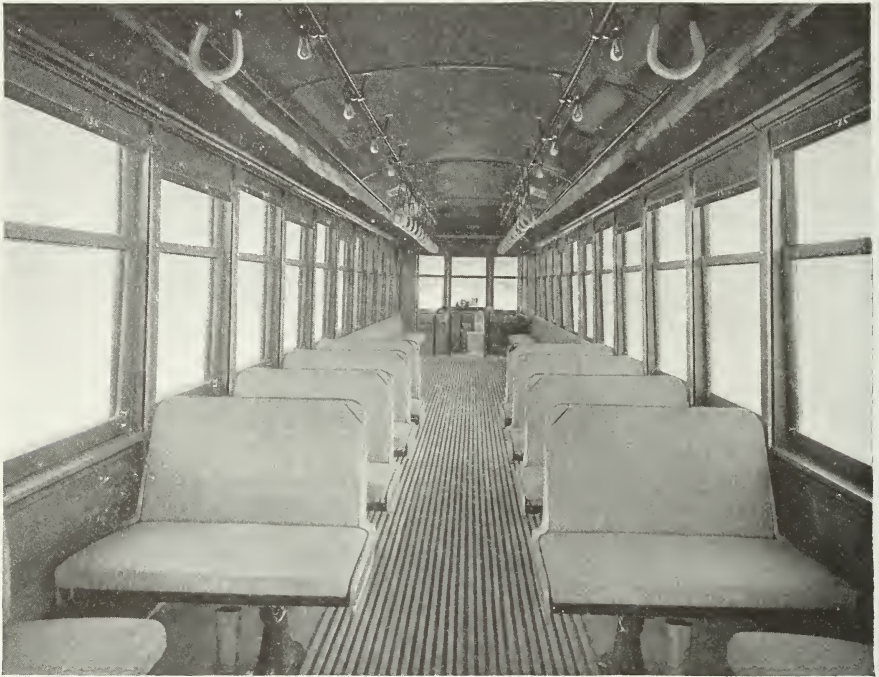


MOTOR AND TRAIL CARS FOR CANADIAN CITY. Vestibule side windows are protected by bronze window rods

a like number of trail cars embodying a number of features that are somewhat out of the ordinary. Both motor cars and trailers are of the same length and general type, which, in itself, is a departure. The new cars are for use on St. Catherine Street, the trunk line of the Montreal system. Under normal conditions, the headway maintained on this thoroughfare is one and one-half minutes, which the company regards as about the limit of efficient one-car service; hence the trailers. Another point in favor of the trailers is that the

nor the usual maintenance charges due to low trailer mileage.

In this connection it must be borne in mind that, while the city covers a considerable area, the business section; that is, the part in which are located the shops, office buildings and banking institutions—and Montreal is very well supplied with all these—is comparatively small, and consequently the congestion of traffic, especially during the peaks, is great. The door system of the new trains, which is explained farther on in this article, will overcome much of the delay of



MOTOR AND TRAIL CARS FOR CANADIAN CITY. Transverse seats are stationary and are of Brill manufacture

loading and unloading at points of heavy traffic.

The cars are of semi-steel construction, with underframes made up of steel plates and structural shapes, as is indicated in the accompanying framing plan of the motor car. Both the motor and trail cars have side sills formed of 18 in. by $\frac{1}{4}$ -in. steel plates, reinforced at the bottom by 6-in. channels and at the top by 3 in. by $\frac{5}{8}$ -in. bars. Center stringers consist of 4-in. channels. End sills of the motor cars and the front end sill of the trailers are formed of 9-in. channels. In order to reduce the weight, however, and in consequence of the rear end of the

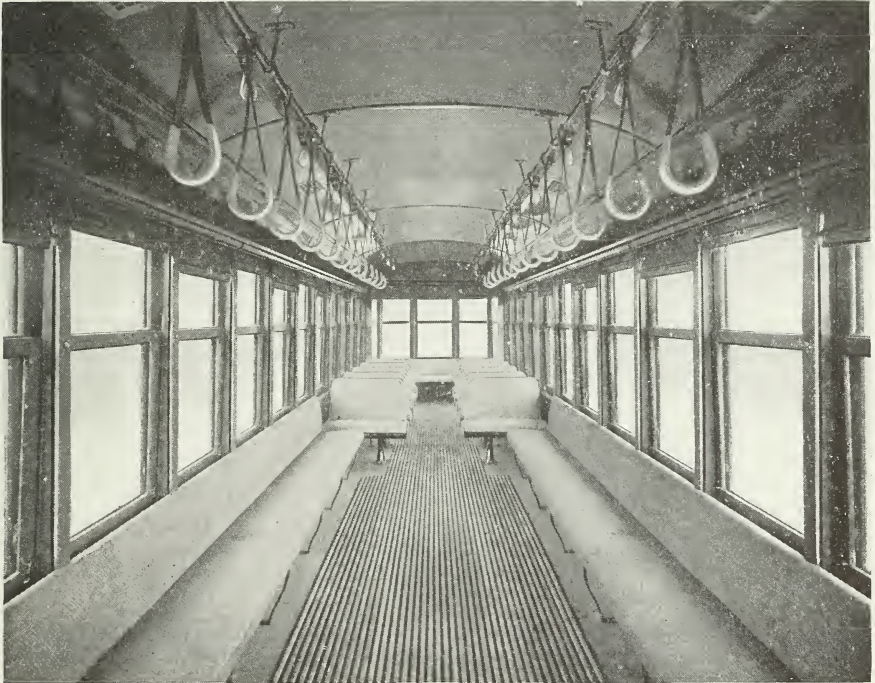
trailers being subject to no extraordinary strain, a 7-in. channel forms the sill at this end. In the construction of the motor car underframe 12 crossings are employed. Of these, six are formed of 4-in. channels, while the remainder consist of light angles. Six 4-in. channels form the crossings of the trailers. Motor car platforms are supported on outside knees of 6-in. channels and center knees of 4-in. channels. Similar construction is employed in the front platform of the trailer, but the rear platform, which is subject to the constant weight of seated and standing passengers, is supported on outside knees of 8-in.

channels with 5-in. channels for center supports.

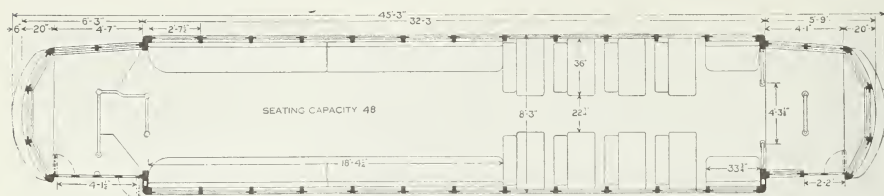
Corner and side posts of both types are of ash, and the plain arch roof is supported on steel rafters at each post, with wooden carlines between. Side panels are of sheet steel and extend from the sill plate to the belt rail, the joint between the sill plate and side panel being covered with pressed steel shapes. All platforms are enclosed in round-end vestibules, sheathed outside below the window sills with sheet steel.

Front platforms have three single drop sashes in front, that in the center of the motor car front platform being adjustable. Aside from

those in the vestibules, all windows are of the double sash type, the upper sashes being stationary, while the lower ones are arranged to drop into pockets. All side windows are provided with wire mesh screen guards and with storm sashes for use during the severe winter months. These storm sashes are so arranged that they can be attached by means of the clips used for the screens. When they are in place, the inner windows are not opened. The advantage of these removable storm windows will be immediately apparent to all who are familiar with the rigors of the Montreal winter, where the often extreme cold and heavy snowfalls



MOTOR AND TRAIL CARS FOR CANADIAN CITY. Arrangement of seats in trailers is the reverse of that in motor cars

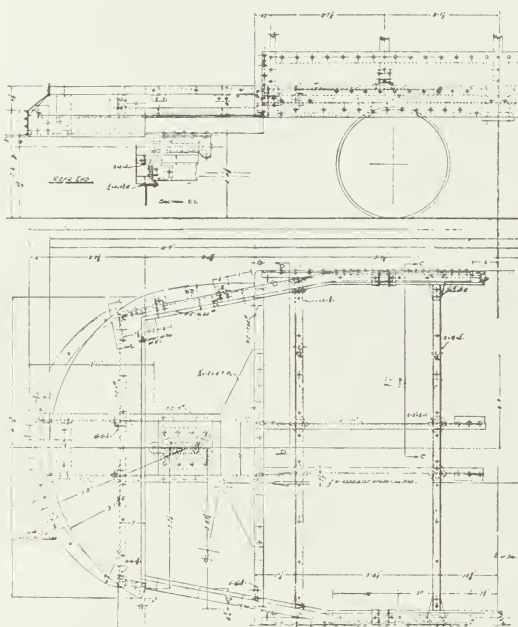


MOTOR AND TRAIL CARS FOR CANADIAN CITY. Motor car: Track to floor, 3 ft. 0 $\frac{1}{2}$ in.; track to trolley board, 11 ft. 4 $\frac{1}{4}$ in.; track to step, 16 in.; step to platform, 12 in.; platform to floor, 8 $\frac{3}{4}$ in. Weight of car body, less electrical equipment, 17,000 lb.

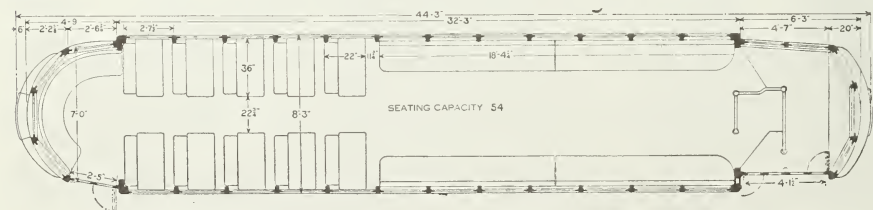
make necessary such extra protection for passengers.

The door arrangements are interesting. On the brake staff side of the front platform of the motor car is a two-leaf folding door, operated from the motorman's position. This is paneled with wire glass in the lower part and with clear glass above. The rear vestibule of the motor car is

fitted with two two-leaf folding doors, operated separately or in unison in conjunction with folding steps, by means of a mechanism controlled by the conductor. A similar arrangement is installed in the front vestibule of the trailer, while in the rear is a single two-leaf folding door for use in emergencies or at terminals. By this system all of the



MOTOR AND TRAIL CARS FOR CANADIAN CITY, Frame plan, showing rear platform construction of trailer

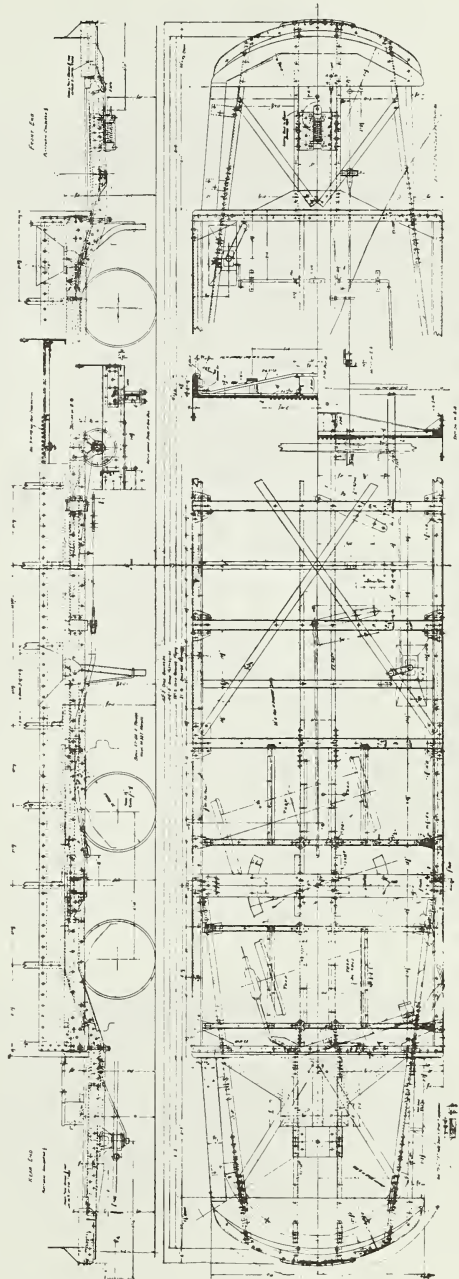


MOTOR AND TRAIL CARS FOR CANADIAN CITY. Trailer: Vertical dimensions similar to motor car, save for allowance of 2 in. in height on account of trolley board. Weight of car body, 18,000 lb.

loading and most of the unloading is done at the center of the train, thereby avoiding the delays which occur where entrances and exits are more widely separated. All doors are wired in series, consequently the motorman does not receive the signal for starting until all doors are closed. As the resistance for the door circuit is carried on the motor car, the door signals may be operated whether the trailer car is in use or not.

The motor cars are mounted on Brill No. 27-GE2 trucks and the trailers on Brill No. 67-F trailer trucks.

Any description of the Montreal system must necessarily refer to the progressive policy followed by the railway company. The city was among the first to substitute electric for horse cars and was what may be termed the birthplace of the pay-as-you-enter car. Many of the lines, and particularly the St. Catharine Street line, for which the new cars are especially intended, are long and the city is hilly, with many difficult grades. With all these handicaps, however, in addition to the severity of the winters previously alluded to, the company maintains a most excellent service over about 240 miles of track which thoroughly covers not only the city proper, but extends for some distance into the suburbs.



MOTOR AND TRAIL CARS FOR CANADIAN CITY. Underframe plan of motor car. Trailer construction similar, save as noted in text.



CENTER-ENTRANCE TRAILERS. Glass panels in doors are regarded as aids in the prevention of accidents

Center-Entrance Trailers for the New York State Railways

Rochester Lines



SOME time ago the Rochester Lines of the New York State Railways put into effect a system of through-routing which, for a time, relieved congestion. A steady in-

crease in traffic, however, made other measures necessary, with the result that an order was placed with the G. C. Kuhlman Car Company for 25 trail cars. The cars were delivered a short time ago and are now in service.



CENTER-ENTRANCE TRAILERS. Side windows are protected on the outside by nine window rods

There are a number of very interesting problems to be solved in connection with Rochester's traffic situation. Unlike many cities of its class, it is not a "one-street town," although Main Street is the principal artery of traffic. Another point is that both sides of

mented by the large number of pleasure vehicles for which the city is noted. While this is very well regulated by the police, it is nevertheless a constant hindrance to railway service. In addition to this, Rochester is the center of a large interurban territory, and

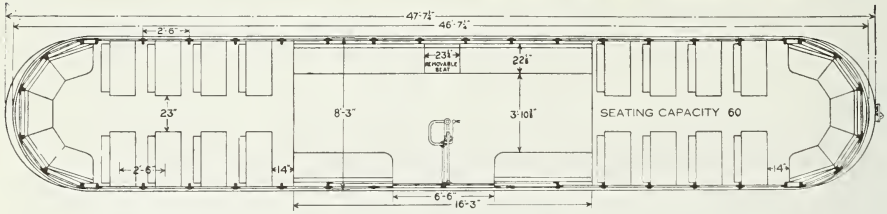


CENTER-ENTRANCE TRAILERS. Hand straps are provided over longitudinal seats in the center well

Main Street and, in fact, nearly all of the principal business streets are of equal importance, and this results in a considerable volume of pedestrian traffic at points other than designated crossings, to the frequent delay of the car service.

The large manufacturing, wholesale and retail interests are responsible for a constantly increasing vehicular traffic, which is aug-

mented by the large number of pleasure vehicles for which the city is noted. While this is very well regulated by the police, it is nevertheless a constant hindrance to railway service. In addition to this, Rochester is the center of a large interurban territory, and



CENTER-ENTRANCE TRAILERS. Track to side sill at bolsters, 2 ft. 2 1/2 in.; side sill to roof, 10 ft. 8 9/16 in.; floor to headlining, 7 ft. 7 1/16 in. Track to platform, 15 in.; platform to floor, 11 in. Weight of car body, 19,040 lb.

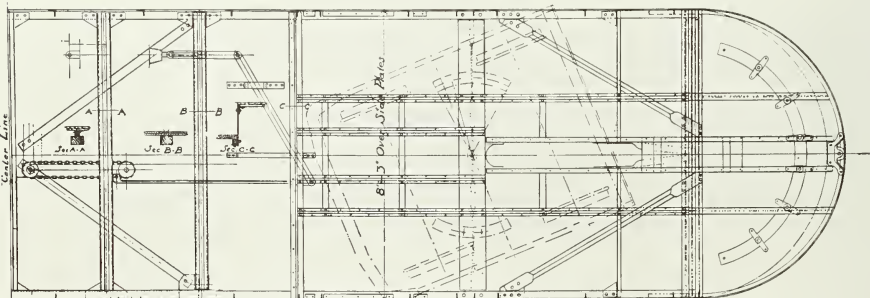
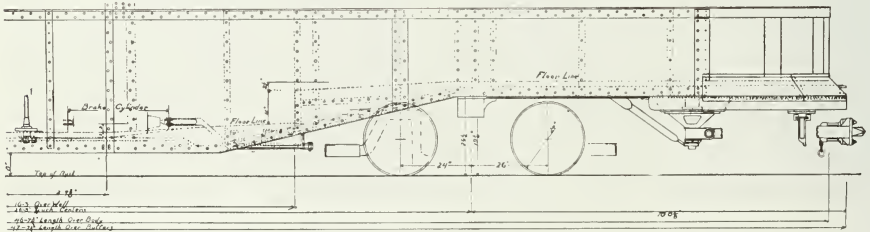
the change would have been of no real value in handling the traffic problem.

The Rochester Lines of the New York State Railways operate over something like 225 miles of standard gage track, including the inter-urban lines. The surrounding country is undulating, with no difficult grades. In the city itself many of the streets are on grades, but, as a rule, these are long rather than steep. The lines reach Ontario Beach, a lake resort owned by the railway company, and also

Sodus Bay, Sea Breeze and Glen Haven Parks, all popular lakeside resorts.

An exhaustive review of Rochester traffic conditions appeared in BRILL MAGAZINE for March, 1913. A perusal of this article and a glance at the map which accompanies it will demonstrate the adaptability of two-car service to the city's needs.

The new cars are of the center entrance, pay-as-you-enter type, with all steel underframes. Side girders of 1/8-in. steel plates extend



CENTER-ENTRANCE TRAILERS Diagram showing interesting underframe and side construction described in text

from belt rail to side sill and form the outer sheathing of the car. At the top edge of this plate is riveted an L section, $3\frac{1}{2}$ in. by 1 in. by $\frac{3}{8}$ in., and at the lower edge is a 3-in. by 3-in. by $\frac{3}{8}$ -in. angle which forms the bottom chord. This is reinforced at the door opening by another angle riveted to it in the form of a channel. The side girder is further strengthened by means of 2-in. by 2-in. by $\frac{3}{16}$ -in. angles, so placed that they act also as supports for the wooden posts of the body framing. Additional reinforcement is provided at the bolsters by means of two angles of suitable size. Intermediate longitudinal members are formed of T-bars, as shown in the accompanying diagram.

On the devilstrip side of the car, the side girder is, of course, continuous from end to end, but on the open side, the girder is carried over the door opening by means of two 3-in. channels on either side of the doorway. These are placed $10\frac{1}{2}$ in. apart, separated by a $10\frac{1}{4}$ -in. by $\frac{1}{8}$ -in. plate.

The center well is arranged with the floor sloping upward from the doorway to the center line and thence toward the bolsters, making the well 16 ft. 3 in. long. At the ends of this platform are steel cross girders formed as steps 11 in. high. From these points to the

bolsters the floor is ramped $2\frac{1}{2}$ in., but is level from the bolsters to the ends of the car. At the center of the car the floor of the well is supported by five crossings formed of 2-in. channels with oak fillers.

The cars are provided with plain arch roofs, supported on composite earlines and fitted with eight Brill "Exhaust" Ventilators.

Arches are substituted for bulkheads at the ends of the cars, and iron pipe stanchions with suitable cross-pieces are placed at the well steps. The only doors are those at the center, which are of the double sliding type, air operated, with electric control located at the conductor's position in the center of the well. On either side of the entrance and on the devilstrip side of the well are rattan upholstered longitudinal seats. In the center of the latter is a removable section to accommodate a forced-draft heater. The remainder of the car is provided with Brill stationary, transverse seats, while a curved seat runs entirely around each end.

The interior finish is cherry with a composition headlining painted a harmonizing color. Windows are of the double sash type, the bottom sashes being arranged to raise, while the top sashes are stationary. On either side of the door opening, the windows are double to form door pockets.

Wood for interior finish has the advantage over steel in cost and time of making, installing, repairing and in getting at wiring or other covered parts needing attention.

The J. G. Brill Company's Plant

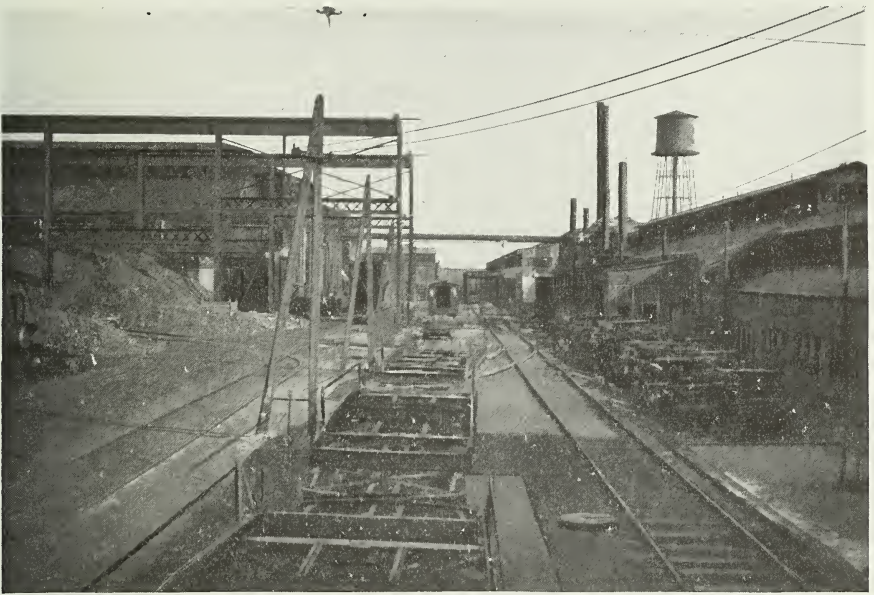
One of a Series of Articles

APPRECIATING the interest of the friends of The J. G. Brill Company, it has been decided to publish in BRILL MAGAZINE during the year a series of illustrated articles descriptive of the plant. The location of the plant is most favorable, as it lies directly between the Pennsylvania and Baltimore & Ohio Railroads, which afford convenient shipping facilities. The boundaries of the plant are Woodland Avenue on the north, the Pennsylvania Railroad on the south, 58th Street on the east and 62d Street on the west, placing the main entrance about four miles from the center of the city.

Entering the main gate and walking in the direction of the General Offices, the visitor passes the Finishing Shop, which is shown in the illustration below. This is one of the most completely equipped shops of its kind. The building contains two pits and approximately half a mile of track on which the cars in process of finishing are handled. The combination transfer table and elevator shown at the left of the illustration is the only one of its kind ever built, and is capable of hoisting



THE J. G. BRILL COMPANY'S PLANT. Framework in foreground contains canvas curtains against which cars are photographed



THE J. G. BRILL COMPANY'S PLANT. View toward the east on the north side of the plant

cars with an overall length of 40 feet, and of transferring 60-foot cars on the ground level.

Turning to the left after passing the Finishing Shop, one walks past the General Offices toward the Smith and Forge Departments. As the illustration at the top of this page indicates, the entire plant is amply provided with track room, there being 3,700 feet of track exclusive of crane runs and transfer tables. The trackage is under control of the Transportation Department, which also has charge of the equipment of steam and electric locomotives and locomotive cranes and the movement of all rolling stock, such as shop trucks, etc.

A portion of the Forge Department is shown at the left of the illustration, immediately beyond the 70-foot crane. Here it is that the solid forged side frames, which are a feature of Brill trucks, are shaped on a battery of four hydraulic presses of 3,000 to 4,000 tons capacity. The Smith Shops, shown at the right of the picture, contain at one end equipment for drop forgings, while at the other end are located the steam hammers and hydrostatic bulldozers.

Beyond these buildings are the Steel Car Department and the Truck Shop, which will be the subject of future descriptive articles. It is the intention to go sufficiently into detail in the coming articles of the series to give the readers of BRILL MAGAZINE a fairly definite idea of the completeness of the Brill Plant.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

The man who dreams of what he would like to be and stops there is a loafer. And worst of all, he is loafing on himself.

No man can stand on the platform of a car, or any other place, for that matter, and dream himself into the general manager's chair. That is unnatural and impossible.

But given a clean, adaptable mind and sufficient energy, the man who dreams of better things and then gets out and hustles for them, will surely get them.

One of the wisest men in the world—so far as this generation knows anything about it—was Solomon of the Bible. He is quoted as having said: "As a man thinketh in his heart, so is he."

He didn't mean that if a man merely thought he was superintendent or manager or something else, he could go right out and exercise all of the functions of the job he thought about.

Nor did he mean that a few days or weeks or months of extra effort would make a man what he wanted to be. That also is unnatural and all but impossible.

What the old man really did mean—as far as can be figured out by anybody with ordinary horse sense—was that the man who set his mind on the attainment of a goal above and then studied and worked unceasingly to that end, would eventually get there.

When you come to analyze it, there's nothing so very wise about this particular wisdom of Solomon's—that is, in the light of present-day knowledge and experience. But this is one of the things that everybody knows and very few think of.

The railway world today is full of big men who have come up from below—from apprentice boys, shopmen, trackmen, conductors, motormen, clerks in offices—almost every position in the gift of a railway.

They haven't come up with a jump—that is, with very few exceptions, and this is not written for the exceptional man. It has been a matter of years of thought, striving, and hard, dirty work. It has been a matter of meeting disappointment after disappointment and of fighting against heavy odds.

But the point is, these men have come up and so can you. Any man of average mental attainments and health can put himself where he wants to be if he makes up his mind to do it and applies the proper mental force. Moreover, the world cannot and never will have too many big men. There is always a place open for the right man.

Control

TO do proper work a man must have perfect control of the tools with which that work is to be done—and in this connection the word tools is used in its very broadest sense. But no man can properly control tools until he has learned to control himself. Think what would happen if a railway man lost his head—lost control of himself—in an emergency. Self-control is a habit. Any habit can be acquired. This is one habit that will be of value. Cultivate it.

Railway Maps in Schools

A PLAN for stimulating interest in electric railway facilities, that has worked out successfully in a number of cities, involves co-operation with the educational authorities. Railway maps, suitable for wall hanging, together with descriptive literature, are sent to the public schools, and the pupils are given instruction in the lay-out of their own cities, learning in this way the streets on which the cars run and the various transfer points. The plan has been of special value in schools having a large foreign membership.

The Time Clock

TIME clocks are used by the company not alone for keeping a record of a man's hours, but also for the purpose of stimulating a man's interest in his own record. That the company is entitled to a full day's work for a day's pay goes without saying, but if looked at in the right way, a man can get a great deal of personal satisfaction out of competing with himself to beat his own time. By the way, did you ever try competing with yourself in all branches of your work? It is a very interesting and satisfying performance to find you are doing a little better each day.

The Supplement

THE supplement to this issue of BRILL MAGAZINE shows one of the series of advertisements which appeared in the *Electric Railway Journal* during January and to which reference was made in the last issue of BRILL MAGAZINE. The series will be changed every month. That running in the February issues of the *Journal* deals with center-entrance cars.

The Suggestive Subjects

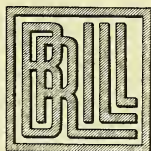
THE returns of a general canvass of a portion of BRILL MAGAZINE mailing list, a short time ago, showed a very large percentage of the readers of the magazine to be in favor of continuing the Suggestive Subjects published on these last pages. It is desired to again call the attention of managers to the fact that this matter is intended for such use as they may desire to make of it, and that for such purposes the general copyright covering the contents of the magazine is waived.

Brill Magazine Contents

IN answer to a number of inquiries, it may be stated that the contents of BRILL MAGAZINE is entirely original—that is, no material is culled from other publications. It occasionally happens that the use of copyrighted photographs, maps or diagrams is necessary, and, in such cases, due credit is given. But the editorial matter, the advertisements and their illustrations, cover designs, etc., are prepared entirely by the Brill organization from data and ideas secured from original sources.

Railways and Public Relations

THE optimism with which railway men view the future of city and interurban transportation is to a large extent an acknowledgment of the strength of the American Electric Railway Association and the far-reaching effects of its investigation and analysis of problems in various branches of the industry, and the action which will follow the results of this investigation. The members of the Public Relations Committee, recently appointed by President Black, are planning to proceed on a broad plan with the important work which the name of the committee implies. At the recent mid-year meeting of the association in New York, President Black sounded a call to arms and showed that the co-operation of every man in the field is essential to the work of changing in many respects the attitude of the public and thus securing for the railways that fair play which is necessary to furnish the most efficient public service.



The J. G. Brill Company

Main Office
Philadelphia, U. S. A.

Cable Address: "BRILL," Philadelphia

London Office: 110 Cannon Street, E.C.

Cable Address: "AXLES," London

American Car Company, St. Louis, Mo.

G. C. Kuhlman Car Co., Cleveland, Ohio

John Stephenson Co., Elizabeth, N. J.

Wason Manufg Co., Springfield, Mass.

Cie. J. G. Brill, 49 Rue des Mathurins, Paris

Cable Address: "BOGIBRIL"

Agencies

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PIERSON, ROEDING & Co., 118 New
Montgomery St., San Francisco;
Los Angeles, Portland, Seattle

Australasia

NOYES BROTHERS, Melbourne, Sid-
ney, Dunedin, Brisbane, Perth

Belgium & Holland

C. DUBBELMAN, 24 Place de Lou-
vain, Brussels

Argentine & Uruguay

SHACKLEFORD & Co., Calle San
Martin 201, Buenos Aires

Natal, Transvaal & Orange River Colony

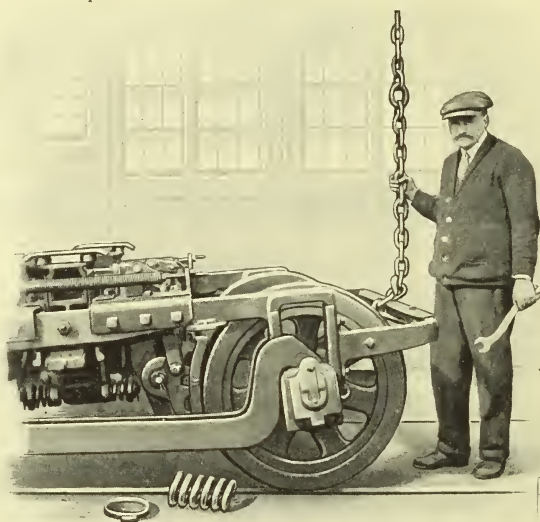
THOMAS BARLOW & SONS, Durban,
Natal

China

SHEWAN, TOMES & Co.
Hong Kong, Canton, Shanghai

Italy

GIOVANNI CHECCHETTI
Piazza Sicilia, 1, Milan



BRILL No. 27-MCB TRUCK

THE frame of this Brill No. 27-MCB Truck is raised to show the brake system, of which the Brill Half-Ball Brake Hanger is an important part. It also illustrates the easy method of raising the truck off its wheels by removing the short tie-bars. Built for high-speed service, the truck is thoroughly M.C.B., and the solid forged side frames provide the safety and efficiency demanded by this class of service, maintaining security against the heavy strains put upon a truck of this type. These solid forged side frames, which are a feature only of Brill Trucks, are guaranteed against any breakage not caused by collision or derailment.

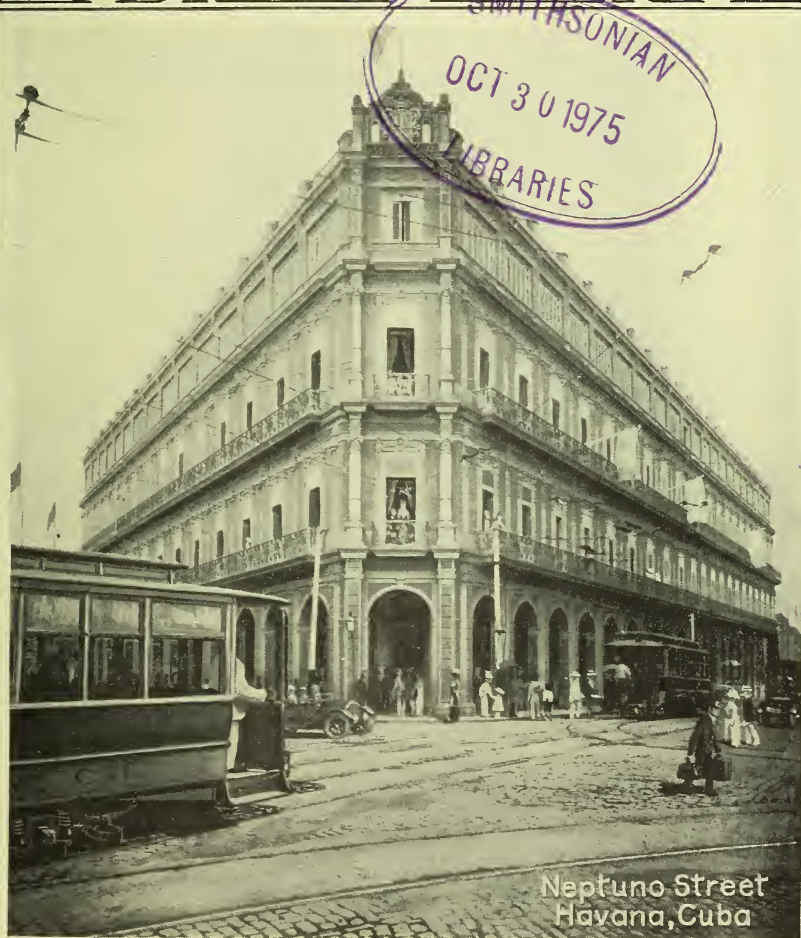
THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA

Vol. VIII

Coastal 2085
B75
MARCH, 1914

No. 3

BRILL MAGAZINE



Brill Supplies and Specialties

BRILL Supplies and Specialties are made for service and, being strictly utilitarian, are, naturally, first in quality and handsome in appearance. With the approach of the Summer Season comes the overhauling of rolling stock and the consequent need of supplies. The Brill Line embraces everything needed for proper equipment:

Brill Curtains of any material, for open and closed cars.

Platform Steps and Step Hangers for all types.

Angle-Iron Bumpers and Bumper Shields for any type of car.

Round-Corner Seat-End Panels and Running-Board Hangers for open cars.

Half-Ball Brake Hangers, Drawbars, Grab Handles, Ratchet Brake Handles.

"Dedenda" Alarm Gong and "Retriever" Signal Bell, beyond all question the best.

Send for Brill Order Guides for Car and Truck Parts.



C. H. Waring

PRESIDENT, KNOXVILLE RAILWAY & LIGHT COMPANY

Sincerity

Sincerity is one quality without which the business man cannot hope for success nor respect. It is a quality that is often counterfeited, but the false sincerity soon becomes apparent; it can be sensed more readily than any other assumed attribute.

The possession of sincerity or its acquisition—for, like other mental qualities, it can be acquired—is largely a matter of environment and association. With some it is inborn; with others it is acquired through earnest effort and unsparing frankness with oneself. It is well to believe that most men are sincere.

Were this not the case, the world would not be the pleasant place it is.

Given sincerity, energy and dependability, but especially sincerity, a man will go far in this life of ours.

Volume
Eight


Brill Magazine

Number
Four

April 15, 1914

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Charles H. Harvey

HARLES H. HARVEY, president of the Knoxville Railway & Light Company, was born October 10, 1861, at Anamosa, Ohio. He obtained his early education first in the school of his native place and, later, at Beloit, Wisconsin. In 1885 he graduated from the University of Michigan with the baccalaureate degree. On completion of his university course he entered the employ of the East Tennessee, Virginia & Georgia Railway Company, now the Southern, as secretary and, later, as chief clerk to the general manager. In 1895 he went with the Knoxville Electric Light & Power Company as general manager. At that time the company was controlled by the street railway interests, but, some time later, the two were combined under the name of the Knoxville Traction Company, in which Mr. Harvey retained the office of general manager. In 1905 he organized the Knoxville Railway & Light Company, which took over the interests of the Knoxville Traction Company. Mr. Harvey continued as general manager until he was elected to his present office of president of the corporation. In addition, Mr. Harvey is president of the Electric Supply Company of Memphis and vice-president of the Fountain City Land Company and the L. S. Hall Company, both of Knoxville. He is a member of the Cumberland, Cherokee Country and Appalachian Clubs and of several secret orders. He served as aide-de-camp, with rank of colonel, on the staff of Governor Hooper of Tennessee, and has the distinction of being past grand commander of the Knights Templar of the State of Tennessee.

Conditions Which Govern the Type of Car for City Service

Havana, Cuba

HAVANA, the foremost city of the West Indies in point of population and commercial importance, is situated on the northeast coast of the Island of Cuba, of which it is the capital, and is about 90 miles southwest of Key West, Florida. The census of 1907 gave the city a population of 302,526, but the number of inhabitants at present is reliably estimated at about 325,000. To this must be added a very large floating population, for, in addition to its standing as a commercial point, the city is a most popular resort for tourists, especially during the months of December, January, February and March, when thousands of pleasure seekers find convenient transportation by the daily steamer service from the Florida ports and a semi-weekly service from New York. The fear of disease, especially yellow fever, which in former years deterred many from visiting the city, was removed by the measures inaugurated during the American occupancy and continued afterward by the Cuban Government.

The harbor of Havana is one of the finest in the world, being a land-locked bay, spacious and easy of access. The entrance averages about 260 yards in width, and is free from rocks and bars. Inside

the bay divides into three distinct arms, Marimallena, or Regla Bay, Guanabacoa Bay and the Bay of Atares. There is ample depth along a considerable portion of the waterfront for large merchantmen to come alongside to discharge and receive cargo. Although, for centuries, sewage and all manner of refuse was permitted to pollute the harbor, the extent to which this has raised the bottom is greatly exaggerated, according to the best authorities and, certainly, the available depth for commerce has not been impaired.

Viewed from the sea or the bay, the city presents a very picturesque appearance. Founded early in the sixteenth century by Spanish settlers, the early Spanish custom of narrow streets and low, thick-walled houses was followed. Although there are a number of buildings up to four stories in height, most of the houses are of one high story. For over 400 years the city was distinctly Spanish in type and customs, notwithstanding its proximity to the United States. Since the overthrow of the Spanish regime, however, and the influx of American capital and labor during the first American intervention in 1899, the customs have been gradually changing and the city is daily becoming more and more Americanized.

The promenades, drives and public gardens of Havana are world-famous. On the Havana side of the bay is a sea wall, along which is an excellent drive. In addition to these features, the city is noted for

in the illustration on page 72. This was formerly the residence of the Spanish governors-general, but is now the home of the president of the republic and the seat of national and municipal government.



HAVANA TRAFFIC CONDITIONS AND CARS. Railway system comprises radial lines connecting residential districts with business section

its churches and public buildings which, though conforming to the prevailing customs of low, but massive, construction, are nevertheless extremely fine. Principal among these is the Palace, which is shown

The city was formerly surrounded by a wall, which was begun in 1671 and finished about 1740. Although this was almost completely demolished between 1863 and 1880, and only a few scattered remnants sur-



HAVANA TRAFFIC CONDITIONS AND CARS. Some idea of the narrow from these two views from

vived the American military occupation of 1899-1902, it is still customary to speak of the intramural and extramural city.

The former, or old city, lies close to the waterfront and is laid out with streets so narrow as to make wagon traffic a matter of considerable skill in driving. The business district of the city lies along the waterfront at the extreme eastern end. Obispo, O'Reilly and San Rafael Streets accommodate the finest retail trade.

The residential districts spread out to the northwest, west and southwest into five distinct suburbs. In the city proper, the Prado and the Cerro contain the finest residences, but the new city, including the suburbs, is laid out on a somewhat more spacious scale, with wide streets and handsome grounds

around the houses. Most of the latter, and particularly those of the wealthy, planter aristocracy, are massive structures, built of the limestone which underlies most of the island, with heavily parapeted, flat roofs, grated windows and interior courts. The poorer houses are generally built of brick with plaster fronts, and the sections occupied by the laboring class are densely crowded.

The city is surrounded by defenses built by Spain. Of these the best known are El Morro, with its lofty lighthouse at the harbor entrance, and Cabanas, two views from which accompany this article. There is a bronze relief set into the wall of Cabanas commemorating the "laurel ditch" or "dead line" where many Cuban patriots were shot.



streets and the structural density of the city may be gained
the walls of Cabanas Fortress

Havana commands the wholesale trade of the entire western half of the island and is the commercial and banking center of the Republic of Cuba. Its principal foreign customers are the United States and Great Britain. The two staple exports are tobacco and sugar, although the port enjoys a large trade in fruits, rum, wax, honey, oils, starch and fine cabinet woods. Tobacco is the chief manufacturing industry of the city, there being more than 100 cigar factories of the first class. In addition to making boxes and barrels for the tobacco and sugar trades, the manufacture of wagons and carriages is carried on to quite an extent, and some machinery is also made, but the weight of taxation imposed during the Spanish regime acted as a heavy deterrent to operations re-

quiring considerable capital. This has been removed, however, under the republican form of government and the manufacturing industries of the city are becoming much more varied and extensive. Havana is the starting point of railroad systems which reach all parts of the island.

Taking into consideration the preponderance of narrow streets, the street railway service of Havana is remarkably efficient. The entire system is operated by the Havana Electric Railway, Light & Power Company, which also operates the Insular Railway, an interurban connecting Vedado, the northwestern and most fashionable residential district, with the adjacent town of Marianao.

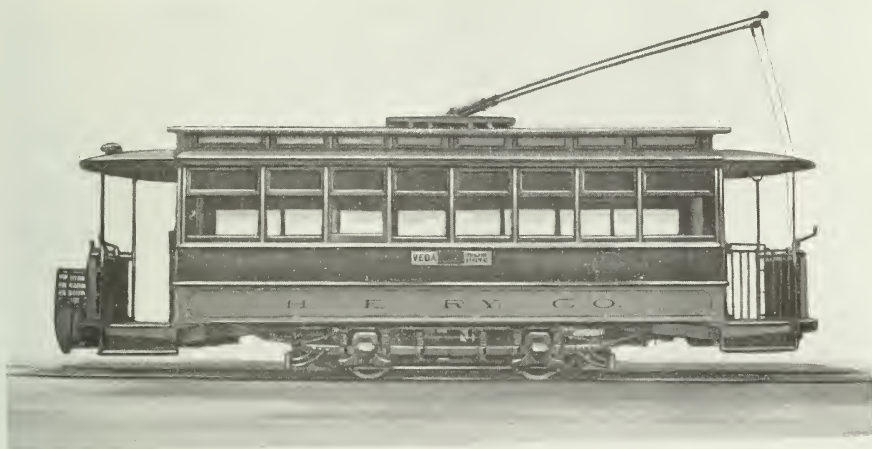
The general plan of operation of the railway system, as the accom-



HAVANA TRAFFIC CONDITIONS AND CARS. The Central Park, where the almost nightly crowds form one of the traffic problems



HAVANA TRAFFIC CONDITIONS AND CARS. The Prado. Center of the city's amusements has ample railway service



HAVANA TRAFFIC CONDITIONS AND CARS. Single truck cars are made necessary by the narrow streets and short curves

panying map indicates, consists of from two to four radial lines connecting each of the five residential districts with the business section. This, in turn, is divided into two

separate and well-defined loops. There are also one or more cross-town lines running out of each of the residential districts, issuing and receiving transfers at points of in-



HAVANA TRAFFIC CONDITIONS AND CARS. Transverse, rattan-upholstered seats provide accommodation for 32 passengers



HAVANA TRAFFIC CONDITIONS AND CARS. The President's Palace. Car shown runs from business district and along waterfront

tersection with the radial lines. The company at present operates, on 28 lines, an aggregate of 296 cars during the peaks, but the lines and service are being extended steadily.

Owing to the narrow streets previously noted, and the necessarily short radius of the curves, the standard type of car in use in Havana is an open platform, closed car, mounted on a single-truck. On a number of cars recently constructed, the Brill No. 21-E truck has been adopted. The cars have wooden underframe and body construction, with the monitor-deck roof, fitted with the usual pivoted ventilator sash. Eight transverse, rattan-upholstered seats on each

side give seating accommodation for 32 passengers. Windows are of the double-sash type, the lower sashes being arranged to raise.

The company's equipment consists of 350 passenger cars, 24 steel dump cars, 24 flat cars, two motor express cars, one observation and one parlor car and 10 freight locomotives. All of the equipment is built in the company's own shops where, at present, 50 additional passenger cars and four double-truck freight locomotives are in course of construction and 25 additional steel side-dump cars are on order. In conjunction with its railway service, the company, as its name indicates, furnishes current for power and lighting.

Double-Deck Steel-Frame Car for Columbus, Ohio

Columbus Railway, Power & Light Company

THE J. G. Brill Company recently completed an extremely novel and interesting type of car for the Columbus Railway, Power & Light Company. As the illustrations indicate, it is of the double deck, center entrance, stepless type and is similar in some respects to the New York double-deck car, although differing considerably in a number of important details.

In designing this car, one of the principal objects was to provide for maximum strength and efficiency, and at the same time keep the weight within consistent limits. When it is considered that the total weight of the car, including trucks and air brake equipment, but ex-

clusive of motors and cables, is 42,000 lbs., and that the frame is all steel, it will be appreciated that these conditions were fully met.

Another most important point to be considered was the fact that the car is intended for service on lines which pass under several viaducts and bridges, making it necessary to keep the height down to the lowest point consistent with the comfort of passengers. Although the height from the under side of the side sill over the trolley board is 5 in. less than that of the New York double-deck car, or 12 ft. 5 in., reference to the accompanying diagrams will demonstrate that there is no lack of head room.

Steel shapes and plates are used throughout in the frame construc-



DOUBLE-DECK CAR FOR COLUMBUS. Brill Special No. 63-E Trucks permit a low-hanging car with plenty of headroom

tion. The side consists of a girder formed of the side sill angles, the pressed steel belt rail and the steel plate sheathing. This girder is carried over the doorway by a truss formed of two $\frac{1}{4}$ -in. steel plates with two 3-in. by $\frac{7}{8}$ -in. bars as spacers. Crossings are formed of two 3-in. channels, placed back to back. Center stringers consist of angles and lighter angles are used as supports for the lower floor. Bolsters consist of Z-bars reinforced top and bottom with 1-in. plates. Two longitudinal arms formed of Z-bars, extend from bolster to end sill and, in addition to supporting the center plate, act as platform supports. The side frame

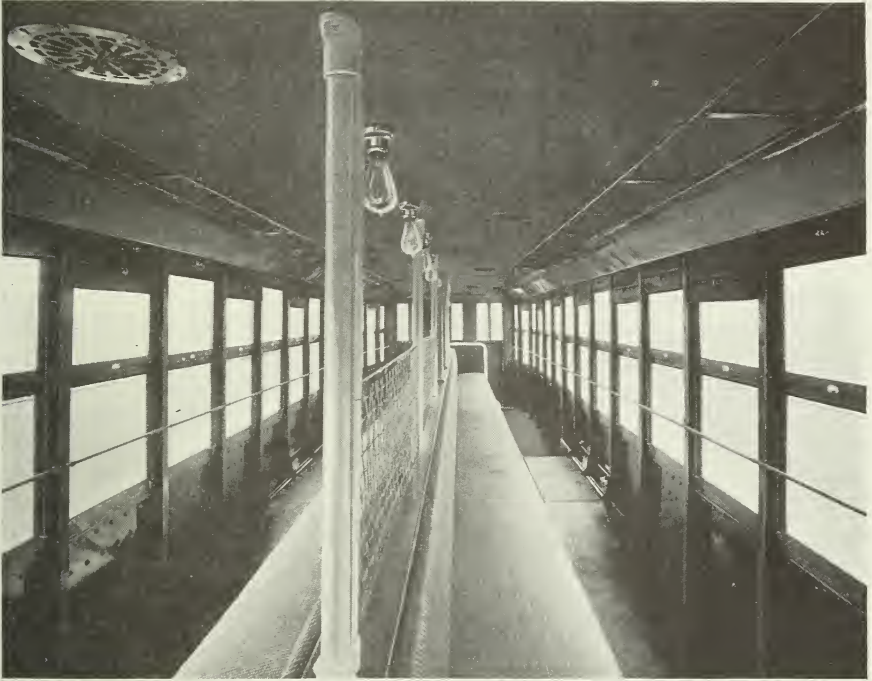
load is transferred to the center plate partly by the bolster and partly by a steel girder, which forms the lower portion of a bulkhead dividing the car body from the motorman's cab.

Corner posts are formed of $\frac{1}{4}$ -in. plates bent into the shape of angles and the side posts consist of T-sections, continuous from side sill to top rail, with wood fillers.

The lower deck rafters consist of steel plates bent into the shape of Z-bars and running from post to post, being so shaped as to conform to the peculiar shape of the roof required for this type of car. The upper deck rafters are steel bars running from top rail to top rail,



DOUBLE-DECK CAR FOR COLUMBUS Stairway arrangement occupies a minimum of seating space



DOUBLE DECK CAR FOR COLUMBUS. Arrangement of seats on upper deck provides ample aisle room

except at the center, where four rafters formed of angles are used to give the necessary support for the trolley apparatus.

The ventilating system is extremely interesting. A motor, placed under the hood at one end, operates an exhaust fan connecting with the air ducts of both decks. The air from the lower deck exhausts through the ceiling ventilators into a duct between the upper deck seat backs, as shown in the small diagram on page 76.

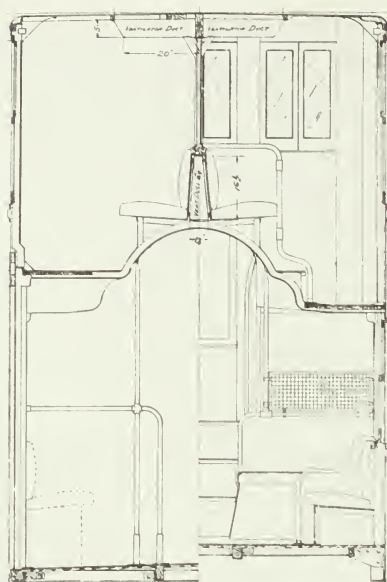
Center doors are of the double sliding type, air actuated with electric control. While these doors are operated from the conductor's position, the arrangement is such

that the motorman cannot receive the starting signal until all doors are closed.

Lower deck windows are of the double sash type, the upper sashes being stationary, with the lower sashes arranged to raise. On the upper deck, the windows are single sash, but in two sections, with the upper section arranged to drop over that below. These upper deck windows may be entirely removed during warm weather. Wire-mesh screens are provided for both upper and lower deck windows, and, in addition, a hand-rail runs along these on the upper deck. The end windows on the upper deck are in two sections, arranged to swing out-

wardly and are controlled by a single lever.

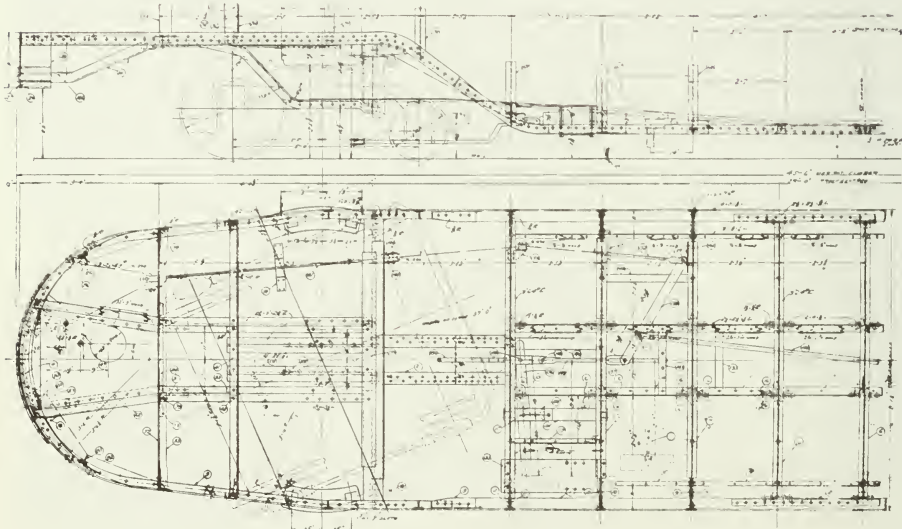
The stairway at each end ascends three steps to a landing, from either side of which a flight runs to the upper deck. The interior finish of the car is cherry, where wood is used, and the metal parts are painted to match. The pipe stanchions at the entrances, as well as those at the stairways and at the backs of the stationary transverse seats, are white enameled. All seats are of Brill



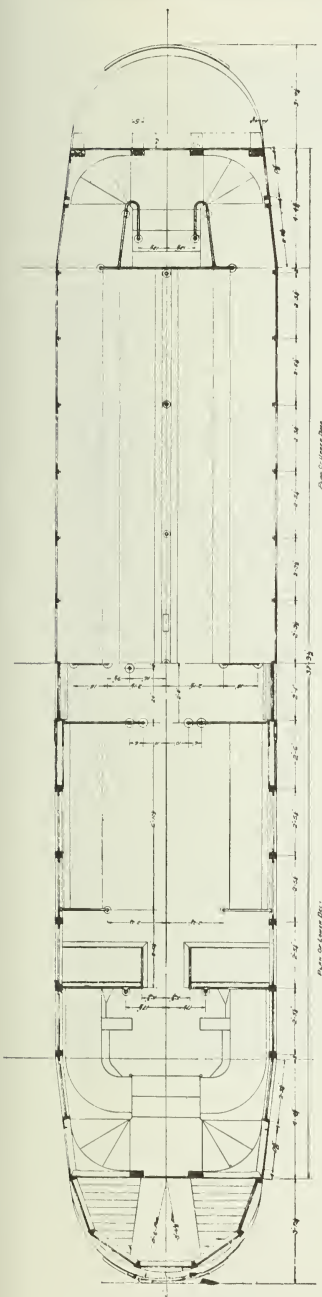
DOUBLE-DECK CAR FOR COLUMBUS. Floor to center of headlining, lower deck, 7 ft. 3 $\frac{5}{8}$ in.; upper deck, 6 ft. 3 $\frac{1}{16}$ in.

manufacture, upholstered in rat-tan. Brass grilles surmount the backs of the transverse seats on the lower deck and of the double longitudinal seat above. There are no hand straps, but hand rails are provided over the longitudinal seats on the lower deck. As is the custom with center entrance cars, the conductor's position is opposite the entrance and is provided

with a desk, and a raised folding seat and footrest.



DOUBLE-DECK CAR FOR COLUMBUS. Frame plan, showing Z bar construction carrying part of side frame strain



DOUBLE-DECK CAR FOR COLUMBIUS. Track to side sill, 8 in.; side sill to trolley board, 12 ft. 5 in. Track to step, 11 $\frac{3}{4}$ in. Weight of body, less electrical equipment, but including air-brake equipment, 31,040 lb. Seating capacity, lower deck, 45; upper deck, 40

Center-Entrance Interurban Cars for Chattanooga

Chattanooga Traction Company



RECENTLY The J. G. Brill Company shipped to the Chattanooga Traction Company a number

of Signal Mountain, where is a resort controlled by the company.

Excepting a few minor features, the cars are of a type similar to those built by The J. G. Brill Com-



CENTER-ENTRANCE CARS FOR CHATTANOOGA. Floor is ramped 3 in. from the bolsters to the center-entrance well

of steel underframe, center entrance, semi-convertible cars. These are intended for service on the railway's lines which run through some of the streets of Chattanooga and through the neighboring suburbs to the summit

pany for the Birmingham, Ensley & Bessemer Railroad and described in BRILL MAGAZINE for March, 1913. Being intended primarily for interurban service on heavy grades, they are mounted on Brill No. 27-MCB1 trucks.

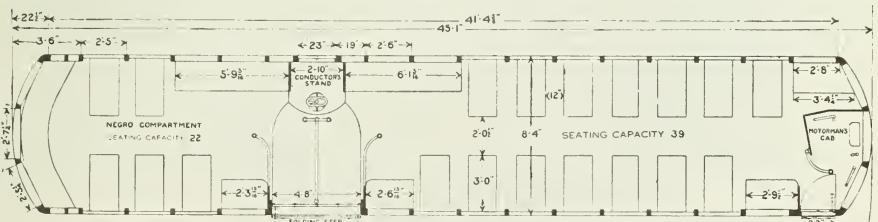


CENTER-ENTRANCE CARS FOR CHATTANOOGA. Brill No. 27-MCB Trucks permit high speed with power to overcome stiff grades

In the underframe construction, commercial shapes and bars are used throughout. Side sills are formed of 6-in. by 3½-in. by ½-in. angles, that on the right being broken at the forward corner post, in order to allow for the exit at that point. This is compensated for, however, by two 4-in. channels, forged to U shape, and by an angle knee riveted to the underside of the sill and channel. Both side sills are depressed at the center doorway to allow for the platform well and the right-hand sill is reinforced at this point by a steel plate, to the top edge of which is riveted an angle reinforcement, which also forms the outer edge

of the platform. There are two center stringers formed of 5-in. I-beams, which extend from each end to the platform crossings, which are in the form of plate girders, reinforced along top and bottom edges by angles. Other crossings are formed of 4-in. channels. At the center are diagonal braces designed to overcome braking strains, while at the ends, the strains attributable to the draft gear, are taken up by other diagonal braces formed of angles.

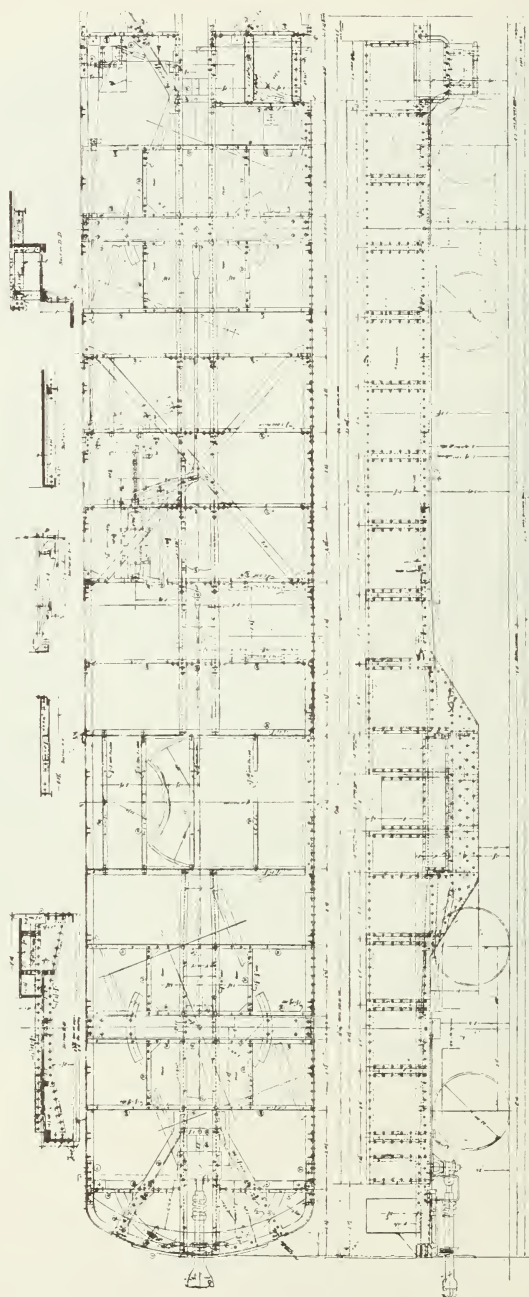
The car is divided into a forward space for white passengers and a smaller space in the rear for the accommodation of negroes. The floor is ramped from the bolsters



CENTER-ENTRANCE CARS FOR CHATTANOOGA. Track to side sill, 2 ft. 10½ in.; side sill to trolley board, 8 ft. 4¾ in.; floor to headlining, 7 ft. 10¾ in. Track to step, 12½ in.; step to platform, 14¾ in.; platform to floor, 10 in. Weight of car body, including air-brake equipment, but less electrical equipment, 21,810 lb.

to the platform crossings and the center platform is dropped 10 in. The platform floor is ramped from the entrance toward the conductor's position immediately opposite. The center entrance is of the double, two-leaf, folding-door type, divided at the center by an iron pipe stanchion, which carries a low sheet-iron partition, separating the car into two sections. These doors, in conjunction with a folding step, are operated by a mechanism controlled by the conductor. Directly back of the conductor's position, on the left side of the car, is a hinged emergency door in two sections. A single, two-leaf exit door is placed on the brakestaff side in front, there being a well at this point arranged to give the same step height as at the center doorway. This exit has a folding step operating in conjunction with the door, the whole being controlled by the motorman.

Corner and side posts are of ash and



CENTER-ENTRANCE CARS FOR CHATTANOOGA. Left side sill continuous from bumper to bumper; right side sill broken at front corner post for exit

the straight sides are sheathed with $\frac{1}{8}$ -in. steel plates to the height of the window sills. These plates are secured to each side of the posts by means of angles. The round-end vestibules are sheathed with sheet steel to the height of the window sills. At the front end, a cab is partitioned off for the motor-man. This is glazed on the left side and open on the right, in order to afford a clear view of the exit.

The interior finish is cherry, with bronze trimmings. Seats are of

Brill manufacture, upholstered in rattan. The transverse seats are stationary. On the left side of the forward end is a folding longitudinal seat occupying space that can, in case of need, be used for carrying light baggage, although the railway company operates a baggage car in conjunction with its passenger service. The side windows are of the Brill Semi-Convertible type and those in the vestibules are arranged to drop into pockets.

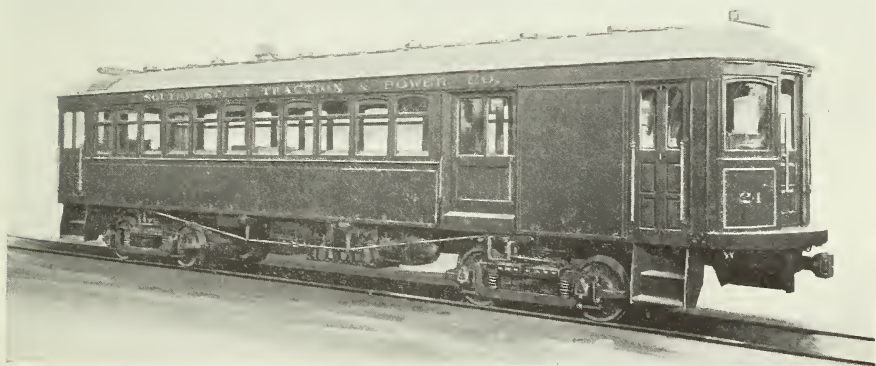
*"A truck is as strong as it's frame." Solid
forged side frames make the strongest trucks.*

Composite Underframe Combination Car

Southwestern Traction & Power Company

AN interesting type of combination passenger and baggage car has been built by the American Car Company for the Southwestern Traction

& Power Company, New Iberia, Louisiana. The car has a composite underframe and is mounted on Brill No. 27-MCB2-X trucks. It is intended for service on the railway company's lines



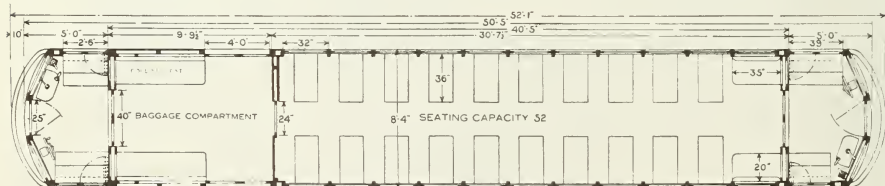
COMBINATION CAR FOR LOUISIANA. The platforms at each end are flush with the floor of the car

connecting New Iberia, Oliver and Jeanerette.

The side sills are built up of 15-in. by $\frac{3}{8}$ -in. steel plates, reinforced at the lower edge by 6-in. by $3\frac{1}{2}$ -in. by $\frac{3}{8}$ -in. angles. The short leg of each angle is placed in a horizontal position and acts as a support for a wooden side sill. The sides of the car are sheathed with sheet steel. There are four center stringers formed of 6-in. I-beams with wood fillers. End sills are of wood, $5\frac{1}{4}$ in. by 6 15-16 in., in sections, reinforced inside

by steel plates, each end of which is turned at right angles and securely bolted to the side sills. Underneath the end sill and extending the full width of the car is a 6-in. by 3½-in. by ¾-in. angle hung from the side sills at the corner posts, and affording support for the four stringers and the end sill sections. Crossings are of wood, and are attached to the side-sill plates by angle timber pockets.

The body frame is of wood and the roof is of the plain arch type. Windows have double sashes; the



COMBINATION CAR FOR LOUISIANA. Track to side sill, 3 ft. 7 in.; side sill to trolley board, 9 ft. 1 in.; floor to headlining, 7 ft. 11½ in. Track to step, 17 in.; three steps to platform, 55½ in. Estimated weight of car body, less electrical equipment, 29,000 lb.

upper being stationary and the lower sash arranged to raise. Vestibules at each end are provided with a trainmen's door in the center, each side of which is a single sash window, arranged to drop into a pocket. Two-leaf folding doors are provided on each side of the

Birch-stained mahogany is used for the interior finish and the car is equipped with Brill "Winner" reversible transverse seats, with one longitudinal seat on each side at one end. On each side of the baggage compartment is a folding slat seat. There is a single sliding



COMBINATION CAR FOR LOUISIANA. Seat-back sockets permit elasticity of sections for negro and white passengers

vestibules, the platforms, which are flush with the floor, being reached by three steps. The baggage compartment has a single sliding door at each side. All doors are glazed in the upper panels.

door in the partition between the passenger and baggage compartments and the bulkheads at each end of the car are provided with mutually operating, double sliding doors.

The modern buyer's maxim—"Confidence procures responsibility." The modern seller's maxim—"Responsibility procures confidence."

Center-Entrance Motor Cars for Cleveland

Cleveland Railway Company

FIFTY center entrance motor cars recently delivered to the Cleveland Railway Company by the G. C. Kuhlman Car Company show a marked departure in design and construction from the center entrance trail cars built for the Cleveland company by the same builder, and described in BRILL MAGAZINE for November, 1912. The new cars were designed by Terrance Seullin,

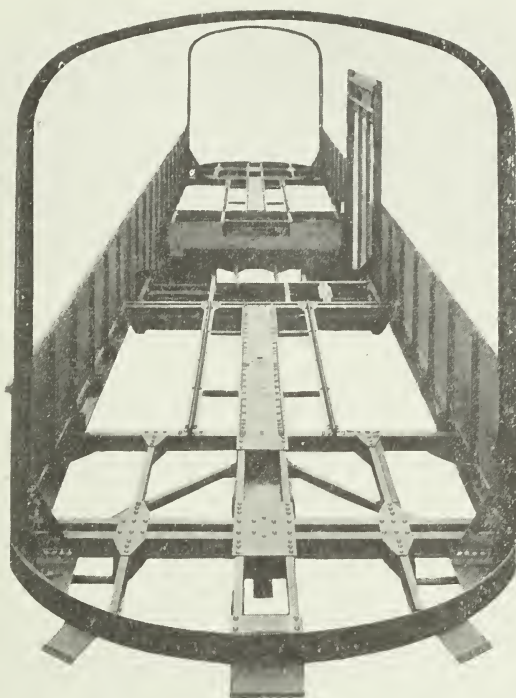
master mechanic of the Cleveland Railway Company, and have met with the general approbation of the public. They are mounted on Brill No. 51-E trucks and are equipped with four motors of sufficient capacity to haul trailers.

As the illustration on page 85 indicates, the underframe is made up of structural steel shapes. The side is a girder having for a bottom chord a 3½-in. by 5-in. by 5-16-in. angle extending from cor-



CENTER-ENTRANCE CARS FOR CLEVELAND. Duct from forced-draft heater runs under longitudinal seating. Heater located in well

ner post to corner post, and for a top chord a 5.4-lb. dropper bar. On the devil-strip side, this member is continuous from corner post to corner post, but on the open side it is broken at the center door post. The web of the girder is $\frac{1}{8}$ -in. steel plate and is stiffened at each side post by two angles to which the posts are bolted. At



CENTER-ENTRANCE CARS FOR CLEVELAND. Underframe and corner posts before body bolsters were put in place

the center opening the girder is carried over the doorway by means of posts composed of angles and plates joined at the top by means of 3-in. I-beams, angles and plates. The central part of the frame is depressed, making a single step from the street to the floor of the center well. The floor of the car body proper is reached by two steps at each end of the well. The transverse members of the frame consist of 12 4-in. I-beams, two 4-in. channels and two 12-in. channels. The I-beams and the 4-in. channels are riveted to the side sill angles by gusset plates and to each other by longitudinal segments formed of 4-in. channels, placed 12 in. out

to out of flanges, and coped to the transverse members. The longitudinal channels are riveted together and to the transverse members by 12-in. by 3-16-in plates. This center sill construction extends to the points of depression of the side sill angles, beyond which it is replaced by eight 4-in. channels

which are riveted to the transverse 4-in. channels by angles and gusset plates, and to the 12-in. channels by gusset plates which hold in position vertical 3-in. channels between the 12-in. and 4-in. channels. The steps above the 12-in. channels are supported by angles riveted to steel plates. The center, longitudinal 4-in. channels are riveted to the bottom flange of the 12-in. channels, which, in turn, are fastened under the pit floor by four 3-in. channels.

Diagonal braces consisting of 2-in. by 2-in. by 3-16-in. angles are riveted, flange downward, between the transverse 4-in. I-beams at the corner posts and the next trans-

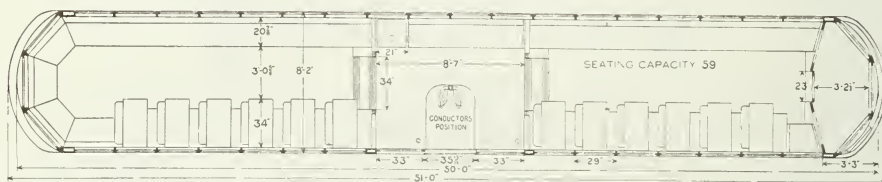


CENTER-ENTRANCE CARS FOR CLEVELAND. Center-entrance doors are arranged to slide into pocket between the openings

verse floor beam. The second and third transverse 4-in. I-beams are fastened together by two 4-in. channels with connection angles and gusset plates. There are four

cables is attached to underframe members in such a manner that the cables can be reached without inconvenience.

The bolsters are built up of two



CENTER-ENTRANCE CARS FOR CLEVELAND. Track to side sill, 2 ft. 8 $\frac{1}{2}$ in.; side sill to trolley board, 11 ft. 7 $\frac{1}{16}$ in.; floor to headlining, 8 ft. Track to well, 12 $\frac{1}{2}$ in.; well to step, 12 in.; step to floor, 7 $\frac{3}{8}$ in. Weight of car body, less electrical equipment, 21,009 lbs.

diagonal 4 $\frac{3}{4}$ -in. by 3-16-in. plates fastened at each end of the transom 4-in. I-beams and the transverse 4-in. I-beams at the center sill. A conduit system for power

pressed steel $\frac{1}{2}$ -in. plate channels forming web members, to which top and bottom cover plates, 9 in. by $\frac{3}{8}$ in., are riveted. The channels have holes punched in them



CENTER-ENTRANCE CARS FOR CLEVELAND. Each of the Brill No. 51-E1 trucks is equipped with separate air-brake cylinder

in order to reduce the weight.

Corner posts are formed of 2-in. by 2-in. by 3-16-in. angles, continuous across the car and finished over with wood. Side posts are of ash. The roof is of the plain arch type and is supported on steel carlines. The Scullin system of ventilation, adopted as standard for all plain arch roof cars by the Cleveland Railway Company, is used. A small ventilating louvre runs the full length of the car body and is supported on aluminum brackets with louvres at the sides. This allows air currents from all directions and creates a vacuum over 13 ducts in the roof. The Scullin system of lighting is also used. This consists of six 92-watt lamps, five of which are in service, while the sixth is used in emergency only. The lights are all controlled by

the Scullin patent selector switch.

The Cleveland Railway Company's system of fare collection, pay-enter and pay-leave, is used on these cars as well as on the trailers now in service. This system was fully covered in the description of the trailers previously referred to.

Twelve Brill stationary transverse seats with pressed steel pedestals and cherry grab rails, upholstered in rattan, are placed on the right side of the car. Longitudinal seating is provided on the devil-strip side and in the well, extending around the curve in the rear vestibule as shown. One of the features of the car is the absence of hand straps, their place being taken by a hand pole running the full length of the car over the longitudinal seating.

Sleeping Cars for Havana

Havana Central Railroad



ALTHOUGH The J. G. Brill Company and its subsidiaries are primarily builders of electric cars, the plants have ample facilities for building large cars for steam railroads, as is evidenced by the sleeping cars built by the Wason Manufacturing Company for the Havana Central Railroad.

These cars have steel underframes, with side sills formed of 8-in. channels. Next to the side sills are two intermediate sills

formed of 8-in. I-beams, and between these are two center sills of 12-in. I-beams, spaced 14 in. center to center. In addition to the main truss rods, there are overhang truss rods formed of 2-in. by 3/8-in. bars. The corner and door posts are of yellow pine, covered with sheet iron and painted before the outside sheathing of red mahogany is applied.

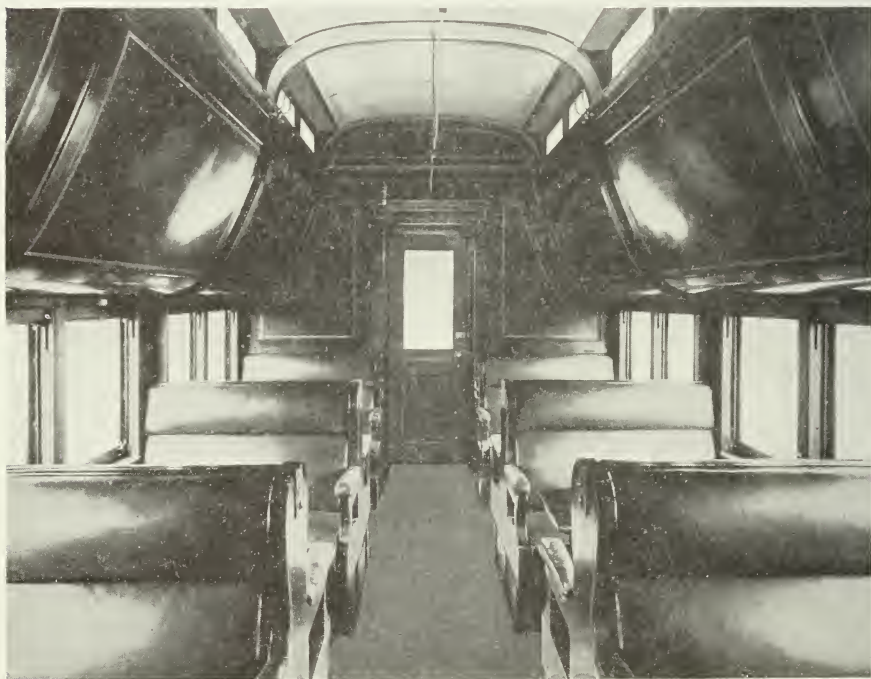
The cars are not vestibuled, the platforms being constructed as integral parts of the steel underframe, with the sills continuous



SLEEPING CARS FOR HAVANA. Length over corner posts, 55 ft. 1½ in. Track to side sill, 3 ft. 5½ in.; side sill to roof, 10 ft. 3¾ in.; floor to headlining, 9 ft. 2¾ in. Track to step, 17½ in.; three steps to platform, 33 in.; platform to floor, 2¾ in. Brill No. 27-MCB trucks

from end to end. The roof is of the monitor-deck type with pivoted deck sash of opalescent glass, screened to prevent the entrance of cinders.

Red mahogany is used for the interior finish, with marquetry ornamentation on the berth fronts and main panels. The windows are of the double-sash type, with



SLEEPING CARS FOR HAVANA. The car body weighs 55,500 lbs. Seating capacity, 44 persons



SLEEPING CARS FOR HAVANA. Third-class cars. Track to side sill, 3 ft. 5½ in.; side sill to roof, 10 ft. 3½ in.; floor to headlining, 9 ft. 2½ in. Track to step, 17½ in.; three steps to platform, 33 in.; platform to floor, 1½ in. Length over corner posts, 53 ft. 9¼ in. Brill No. 27-MCB trucks

the lower sashes arranged to raise. Removable screens are provided for all windows. There are four toilet rooms, one at each end of the car and one connecting with each of

the two staterooms. All seats and sofas are full upholstered in genuine leather, as being best suited to the climatic conditions and class of service, and all hardware is of



SLEEPING CARS FOR HAVANA. Third-class cars have seating accommodations for 62 passengers

Persian brass. The floors are covered with Wilton carpet. Electric push-buttons in each berth and toilet room and on each platform connect with an annunciator at the porter's locker. The cars are lighted by electricity generated from the axles and are supplied with water by air pressure from tanks located beneath the car.

In addition to the sleeping cars, the Wason Manufacturing Company built for the Havana Central a number of third-class passenger

coaches. There is nothing out of the ordinary in the construction of these cars, which conform to the general type of this class. The interior is done in yellow pine with natural finish and the lighting is accomplished by means of oil lamps. Windows are of the double sash type; with the lower sashes arranged to raise, and are provided with slat shutters in two sections. Reversible slat seats have above them luggage racks running the full length of the car.

Single-Truck Cars for Windsor, Ontario

Steel Underframes

AN order for steel underframe, vestibule, pay-as-you-enter cars was recently completed by the G. C. Kuhlman Car Company for the Sandwich, Windsor & Amherstburg Railway, Windsor, Ontario. The cars are intended for one-way

operation and are mounted on Brill No. 21-E trucks.

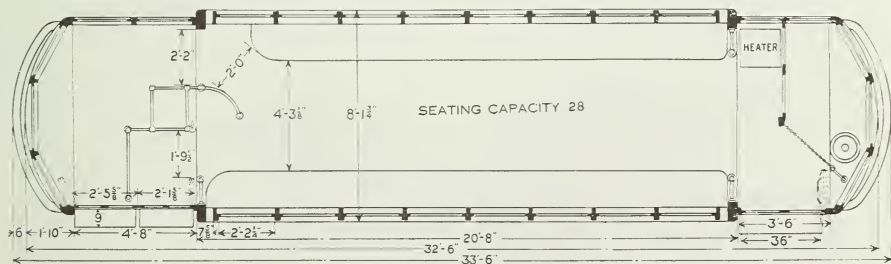
The side sills are formed of steel plates, 14 in. by 3-16 in. These are reinforced at the top by a 4-in. dropper bar and at the bottom, along the outside edge, by a 3-in. by 2½-in. by ⅜-in. angle which carries a 2-in. by 4-in. yellow



SINGLE-TRUCK CARS FOR WINDSOR. The Brill No. 21-E Truck used on this car has a wheelbase of 7 ft. 6 in.

pine sill into which the ash posts are tenoned. Additional longitudinal members are made up of channels and T-sections. The end sills are formed of 9-in. channels and the crossings consist of 5-in. channels. The platforms are supported

The roof is of the monitor deck type, with pivoted ventilator sash. side windows have double sashes, those at the top being stationary.



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while the bottom ones are arranged to drop into pockets. The interior is finished in cherry, with longitudinal seats upholstered in olive-green leather. These have rounded corners at each end, with pipe stanchions at the forward end. A heater is provided on the controller side of the front platform and is separated from the motorman's position by a partition, the upper part of which is panelled in glass.

Vestibules are of the round end type, with double sash windows similar in operation to those in the car body, except for an adjust-

able feature on the center window at each end. The vestibules are panelled inside with sheet steel, which is cut away at the bottom to permit cleaning the window pockets.

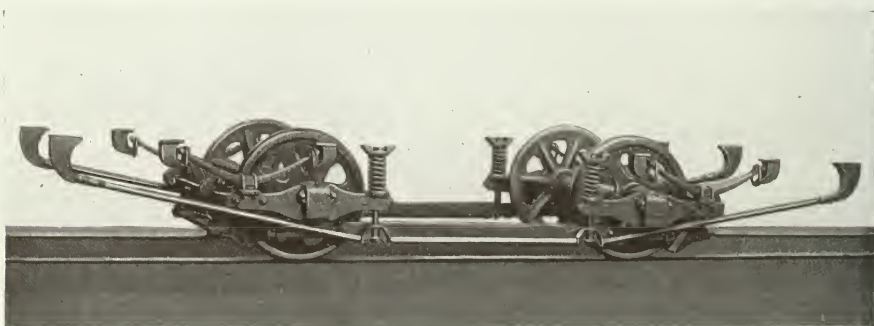
The rear vestibule is provided with double folding doors, each section having two leaves and being arranged to open inward. These doors are operated in conjunction with folding steps by means of a mechanism controlled from the conductor's position, the latter being guarded by pipe railings as shown in the diagram.

The Brill No. 74 Truck

THE Brill No. 74 Truck (patented) is the result of a careful development of the running gear type of truck in order to provide for modern trail car service. It is a vast improvement over the former type of Brill patented running gear which was in general use during the larger part of the horse-

car period and was used extensively in trailer service during the early days of electric traction.

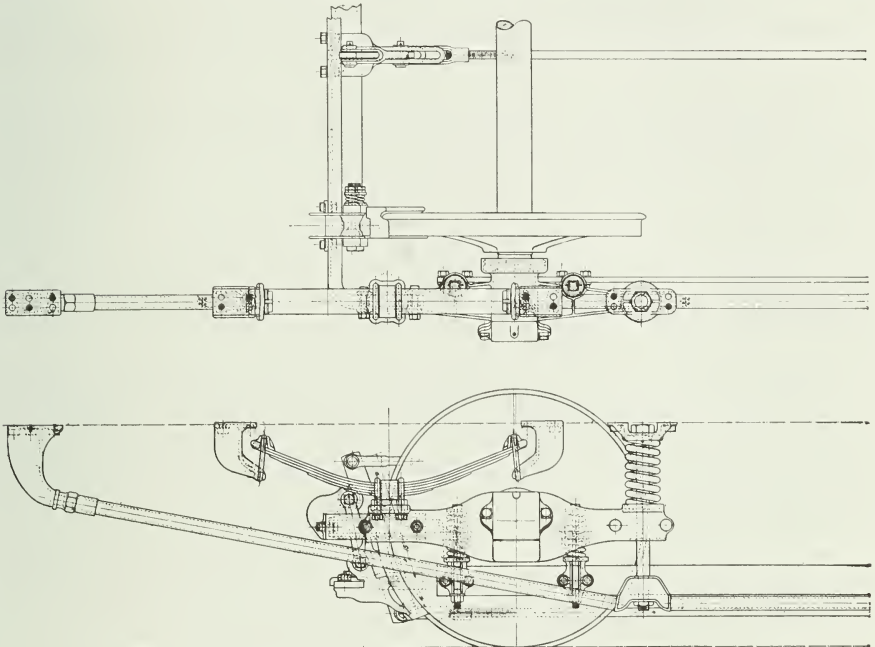
The new truck provides a substantial and easy riding arrangement, having a spring system similar to that of the Brill No. 21-E Truck, but without the solid forged side frames. The main feature, however, is the journal box which, as the illustration indicates,



THE BRILL NO. 74 TRUCK. Spring-seat castings at each end with additional casting make journal box interchangeable

is cast with extensions to support the body coil spring at one end and the semi-elliptic at the other. By casting a seat for the body coil spring at each end of the journal box, and providing an additional casting to fit into this seat, and to serve as a semi-elliptic spring seat,

a running-gear truck. The bar which extends under the journal boxes is attached to each journal box by springs and bolts which pass through holes on each side of the journal box, for the purpose of keeping the journal boxes in proper alignment.



THE BRILL NO. 74 TRUCK. Detail showing spring system and arrangement of brake rigging

the journal box is made interchangeable.

A channel steel crossing forms what, in a motor truck, would be called the end frame, and ties each pair of journal boxes together. Its principal purpose, however, is to serve as a support for the brake rigging.

The axles are maintained in a position parallel to each other by the spring posts, but with sufficient flexibility to suit the conditions of

A body truss pipe, arranged to be bracketed substantially to the car sill, is used on each side of the truck. The truss posts serve also as spring posts, as they pass through the body coil springs and are rigidly attached to the car sills by means of the body coil spring caps. The brake rigging is arranged with a center pull vertical lever, and includes the Brill Half-Ball Brake Hanger, which is standard on all Brill trucks.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

Street railway companies, like all other business concerns, exist for the purpose of rendering service for which they receive payment varying with the number of persons to whom their service is acceptable.

And, like all other business concerns, railway companies are frequently compelled to render service or to do work which, on the face of it, represents a distinct and often heavy loss.

They do this in the belief that the work thus done—the service thus rendered—will meet with an appreciation which will ultimately solidify into cash profits. In other words, they look to the future. Usually the belief is justified.

Nothing but their own welfare urges business concerns to this extra effort. They could proceed on old lines and, possibly, make a regular fixed income for a time. But they would never advance and would, in the end, lose ground.

It is the same way with men. The man who works for his day's pay will receive just that and no more. And, finally, he will be replaced by a better man with broader ideas of service.

That man will not only do his own work to the best of his ability, but he will put into it an enthusiasm that will be worth dollars and cents to him, in that it will keep his mind and body active and fresh.

It will be worth dollars and cents to the company also, in that it will mean that the company's work is being well done and that it is receiving a higher rate of interest on its investment—for every employee is an investment.

In time, this higher rate of interest will be divided with the man who earns it, in the shape of increased salary and responsibilities. It is a natural law that applies with particular force to business, that compensation follows effort. The Bible puts it: "As ye sow, so shall ye reap."

This applies with equal force to every man in the employ of the company, from the boys in the offices and shops to the highest officers. The man who values life, should value the ability and opportunity to work, because without work life is really not worth living. Therefore, he should put into his work the same thought and enthusiasm he devotes to preserving his life.

Habit

HABIT has possibly more influence upon our lives than anything else. And yet habit is subject to extreme change and it is a peculiar and unpleasant fact that good habits are more easily changed than bad habits. Therefore, a man should make constant and untiring efforts to alter those which are bad and retain those which are good. One bad habit, very easily acquired, is that of reporting late for work. This can and should be overcome. One good habit, which, when once acquired, is the most difficult to overcome, is the habit of making good.

Giving of Your Best

SOME men are so constituted that they simply cannot help giving of their best in whatever they do. Most of us, however, are inclined to think that we are not receiving full pay for our efforts and the tendency, therefore, is to slacken up occasionally in order to secure what we are pleased to consider a proper balance. Making a living is worth doing. Whatever is worth doing is worth doing well. Give of the best that is in you.

Some Safety Slogans

There is no excuse for carelessness.

Safety and duty mean about the same thing.

Taking chances means gambling with death. Play safe.

Be as careful of your habits off duty as you are on duty.

The motorman is directly responsible for the lives of the passengers on his car. Be careful.

Dirt breeds disease ; disease means loss of time and money. Keep yourself and things about you clean.

Keep to your schedule, but remember a few minutes lost in being careful may save hours in clearing away a wreck.

The company provides safeguards, but it cannot make you use them. If you don't use them you may get hurt.

Brill Advertisements

ATENTION is again directed to the Brill advertisements in the *Electric Railway Journal*. As has been said, these advertisements are run in series with a change of subject and illustration each week. The illustrations are rather novel and the text deals intimately with the leading points of Brill products. The advertisements always appear on the inside back cover of the *Electric Railway Journal*. The series this month deals with the Brill No. 27-MCB Truck.

Supplies and Specialties

IN view of the fact that, with the breaking up of winter comes the general overhauling of summer equipment, the advertisement on the inside front cover of this issue of BRILL MAGAZINE is especially timely. The Brill Line includes everything in car and truck parts for prompt shipment and is fully covered by two catalogs, No. 200 for Truck Parts and No. 201 for Car Parts. Either or both of these publications will be sent on request addressed to the Publicity Department.

The Double-Deck Car

WHETHER the double deck car will ever acquire in this country the popularity it enjoys abroad is a question that time alone can decide. The operating conditions here, which, in this case, includes the temperament of the people, are so entirely different from those prevailing in countries where the double deck car has achieved its greatest popularity, and the use of this type in this country is too recent to permit even a forecast of its future. The building of double deck cars for this and foreign countries is a matter in which The J. G. Brill Company has had much experience. Each new order involves distinct problems which, however, have been successfully worked out. The latest car of the double deck type to be placed in service is that built for the Columbus Railway, Power & Light Company and described elsewhere in this issue.

Changes of Address

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.

The J. G. Brill Company

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Philadelphia, U. S. A.**

Cable Address: "BRILL," Philadelphia

London Office: 110 Cannon Street, E.C.

Cable Address: "AXLES," London

American Car Company, St. Louis, Mo.

G. C. Kuhlman Car Co., Cleveland, Ohio

John Stephenson Co., Elizabeth, N. J.

Wason Manuf'g Co., Springfield, Mass.

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vain, Brussels

Argentine & Uruguay

FEDERICO H. BAGGE, Calle San
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Natal, Transvaal & Orange River Colony

THOMAS BARLOW & SONS, Durban,
Natal

China

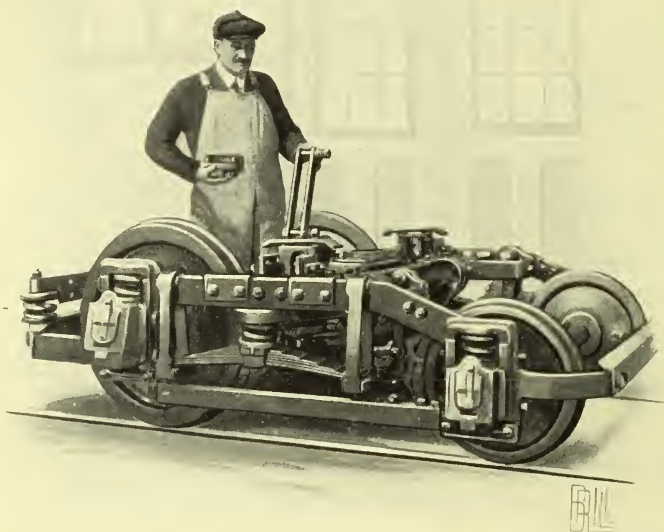
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write the new address on the envelope in which this
magazine is received and return the envelope to the
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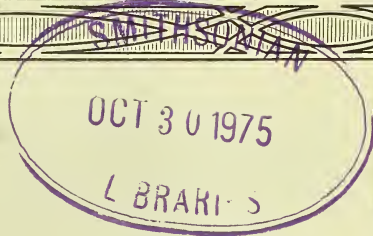


BRILL SINGLE-MOTOR TRUCK

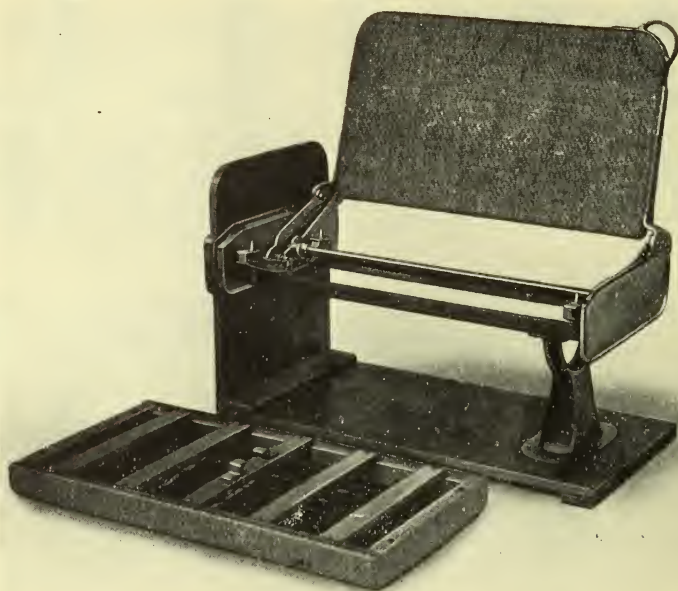
THE new spring system of the Brill No. 39-E Single-Motor Truck is automatically graduated for light and heavy loads, by the introduction of a coil spring between the bolster and the semi-elliptic spring. Furthermore, the links which connect the coil spring seat casting with the bolster are pivoted at each end, permitting the coil springs to take the twist off the semi-elliptics whenever the bolster swings over. The importance of this feature in lowering maintenance costs will be readily appreciated. The brake system includes the Brill Half-Ball Brake Hangers. Side frames are solid forged.

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA

BRILL MAGAZINE

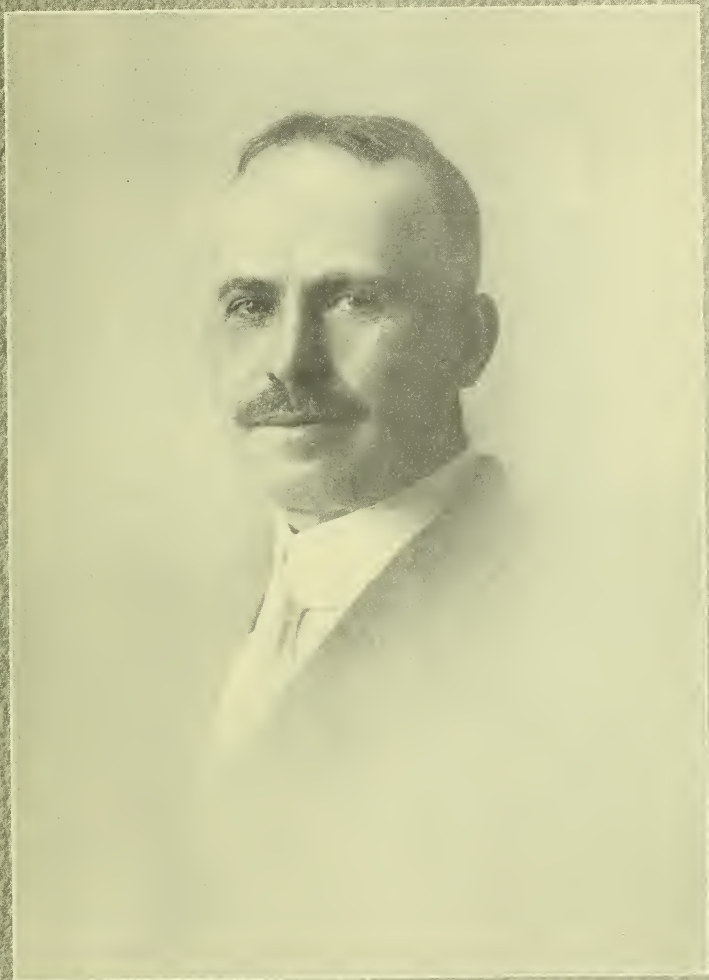


Washington Street
Scranton, Pa.



THE NEW "WINNER" SEAT

THE new Brill "Winner" Seat has double levers at each end which perfectly equalize the action in reversing and provide greater stability without increasing the weight. In fact, the extremely light weight of the new seat—only 63 pounds—is one of its strongest features. When the back is in normal position, the shaft crank engages with the seat lock and holds the cushion firmly in position. By swinging the back over to center, the cushion may easily be removed for cleaning. Made with any style of upholstery or in plain wood.



John A. Meeler

VICE-PRESIDENT AND GENERAL MANAGER
THE DENVER CITY TRAMWAY COMPANY

Poise

Poise, as applied to mankind, may be briefly described as that quality which places the possessor in a position to meet any emergency or condition with an absolute evenness of thought, speech and action.

Naturally, such a quality must arise from the mental rather than the physical state of the individual. This is borne out by the fact that many men who are comparatively weak physically are, notwithstanding, perfectly poised. From the fact, also, that men whose mental attainments are beyond all question, are, nevertheless, lacking in poise, it follows that the quality is the result of thoroughly developed mentality added to what is commonly known as a clear conscience.

The possession of poise is of inestimable value, especially in these days and times. The lack of it places a man at a decided disadvantage. It is a quality that can be attained, but its attainment demands before all else absolute frankness with oneself.

Volume
Eight

Brill Magazine

Number
Three

March 15, 1914

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John A. Beeler

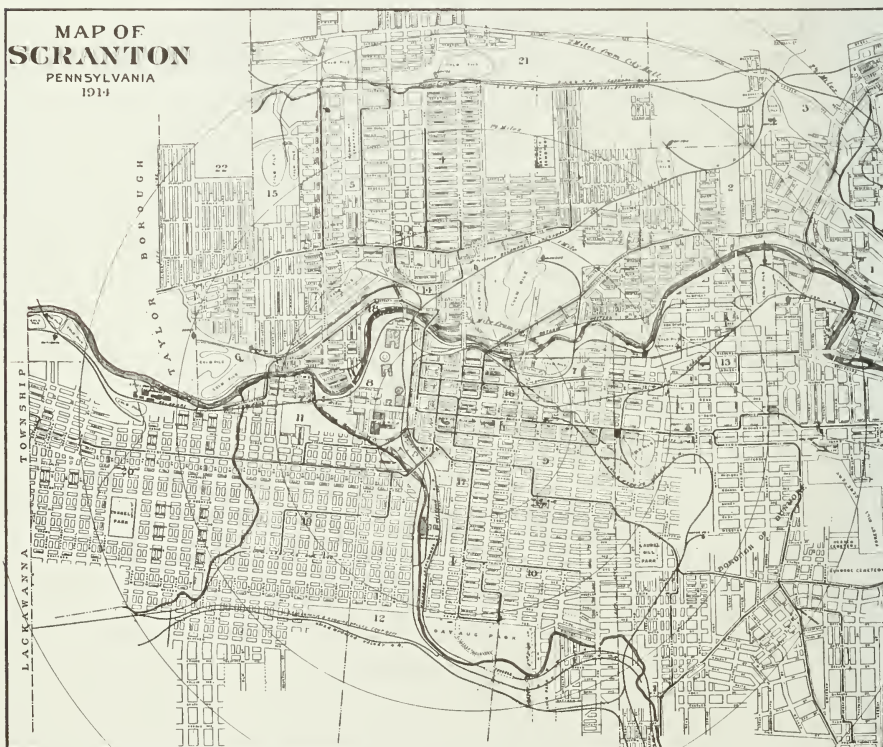
JOHN A. BEELER, vice-president and general manager of The Denver City Tramway Company, was born at Towanda, Illinois, June 28, 1867. Moving later to Cincinnati, he received his early education in the public schools of that city. In 1886 he entered the street railway field as an assistant in construction work with the Engineering Department of the Vine Street Cable Railway of Cincinnati. Continuing in cable construction work, he went to Denver in 1888 as assistant engineer with the Denver Tramway Company. In 1890 he was made constructing engineer for the Denver Tramways, which was then actively engaged in building electric lines, and later, in 1898, was elected chief engineer of The Denver City Tramway Company, which represented a merger of all the railways, cable and electric, in Denver. In 1902 he was elected vice-president and general manager of the system, which position he holds today. Mr. Beeler was among the first to adopt a double-truck trailer car, especially designed for trailer use, for the purpose of handling rush hour loads or peak traffic. He has introduced a number of novel features that have created much interest in the railway field. One is the employment of student conductors, selected from the local universities and high schools, to man the trailers operating during the periods of heaviest travel. This method has proven most successful from the various viewpoints of company, public and employees. Mr. Beeler thoroughly believes that street-car service can scarcely be made too attractive and is an earnest advocate of "Paint, Publicity and Politeness."

Conditions Which Govern the Type of Car for City Service

Scranton, Pa.

SCRANTON is the county seat of Lackawanna County, Pa., and is the third city in point of size in the State. It has a population reliably estimated at about one hundred and thirty-five thousand, although this figure is subject to constant increase, due largely to the efforts of an energetic Board of Trade. The

city is about one hundred and sixty-seven miles north of Philadelphia, lying on high ground, at an altitude ranging from 800 to 1,800 feet. The clear mountain air, healthy climate and fine suburbs, make Scranton a city for home-seekers, while cheap power and excellent shipping facilities offer unsurpassed inducements to manufacturing industries.



SCRANTON TRAFFIC CONDITIONS AND CARS. Loop and terminal system permits excellent service on single track

The city obtained its start in 1840, when the firm of Scranton and Grant erected the first successful furnace in the world for the smelting of iron ore by the hot blast process, with anthracite coal. It is interesting to note that the firm purchased the property surrounding their plant, 503 acres in all, at the rate of \$16.50 an acre, this price including all of the coal and mineral rights. The city now has an assessed valuation of over eighty millions of dollars. At that time, the cen-

tral part of what was later to be the city was an impenetrable swamp in the midst of a wilderness of pine, hemlock and scrub oak. About ten years later, the town had two blast furnaces, with another in process of erection, a machine shop, a saw mill and a small rolling mill, in addition to the us-



SCRANTON TRAFFIC CONDITIONS AND CARS. Lackawanna and Penn Avenues. Railway offices in building at left

ual churches, school, stores and hotel. The population at that time was about one thousand. At first the settlement was variously known as Slocum Hollow and Scranton, but in 1866 it was incorporated as the City of Scranton, embracing the boroughs of Hyde Park and Providence. At present the mu-



SCRANTON TRAFFIC CONDITIONS AND CARS. Wyoming Avenue is one of the few streets having double track



SCRANTON TRAFFIC CONDITIONS AND CARS. Spruce Street; an important line on routes from the east

nicipality covers an area of 20.5 square miles.

Seranton has frequently been termed the metropolis of the anthracite coal fields, and the greatest coal mining city of the world, and, certainly, its annual production of approximately twenty mill-

wagon to New York and New Jersey, where it was exchanged for salt, lime, and other much-needed articles. It was at about this time also that the Lackawanna Iron and Coal Company was organized and began smelting operations in Seranton with anthracite coal



SCRANTON TRAFFIC CONDITIONS AND CARS. Lackawanna and Wyoming Avenues; the busiest point on the system

ion tons of anthracite coal gives it some claim to these titles. The history of the development of this industry is extremely interesting. In 1842, or thereabouts, there were over 100 small mines in the vicinity of Seranton and throughout the Lackawanna Valley. These shipped between 5,000 and 6,000 tons annually by sledge and

taken from its own mines nearby. This corporation grew out of the furnace enterprise noted in the foregoing paragraph. In 1851 the Lackawanna and Western Railroad, as it was then known, was built from Seranton to connect with the Erie at Great Bend. This gave considerable impetus to Seranton's development. The coal de-

posit underlies the entire Lackawanna Valley, and its deepest part occurs very nearly under the central part of the city. This fact accounts for the number of culm piles with which the city is dotted, as the map shows.

product in the mills at Scranton, which takes rank as the second largest silk city of the country. The manufacture of specialties, such as insulated electrical appliances, buttons and advertising novelties, forms another important in-



SCRANTON TRAFFIC CONDITIONS AND CARS. New cars being built by The J. G. Brill Company have similar arrangement of seats

Aside from the coal industry, its manufacturing interests are very large for a city of its size. Among the more important plants are those manufacturing heavy hardware and textiles. The Delaware, Lackawanna and Western Railroad has very extensive shops there.

One-third of all of the raw silk imported into the United States is converted into the manufactured

dustry which gives employment to a large number of hands.

Excellent transportation facilities are afforded, not only by a number of railroads, but by a third-rail system, the Lackawanna and Wyoming Valley Railroad, which connects with Wilkes-Barre and intervening towns and villages, and by the Scranton and Binghamton Traction Company which

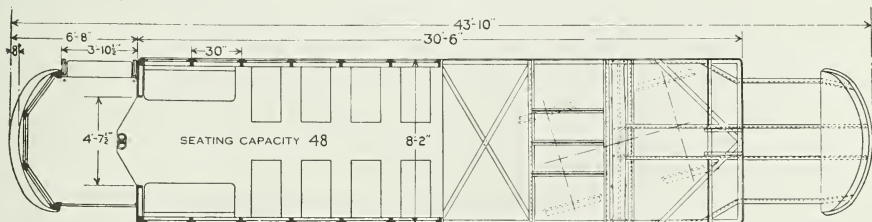


SCRANTON TRAFFIC CONDITIONS AND CARS. The new cars will have plain arch roof from end to end

runs in another direction. The city proper and the surrounding neighborhood is served by the Scranton Railway Company, which is controlled by the American Railways Company.

This railway operates over about ninety-eight miles of track. A considerable portion of this is out of the city proper and is single track, as are a great many of the city lines. This last is due to the fact that many of the streets are nar-

row, but the apparent disadvantage of single-track service has been overcome by a system of loops and terminals, which makes it possible for the company to give excellent service on a large number of streets. A glance at the map which accompanies this article will show how the thing is accomplished. The system is standard gage, with a maximum grade of 13 per cent. The radius of the shortest curve is 33 feet.



SCRANTON TRAFFIC CONDITIONS AND CARS. Track to side sill, 3 ft.; side sill to trolley board, 8 ft. 6 in.; floor to headlining, 7 ft. 7 1/4 in. Track to step, 15 in.; step to platform, 14 in.; platform to floor, 10 in. Weight of car body, less electrical equipment, approximately 18,000 lb.



SCRANTON TRAFFIC CONDITIONS AND CARS. The city is extremely hills. The thoroughfare in the

During the hours of normal service, the company operates 80 cars. This number is increased to 94 during the morning and evening rush hours. The point of greatest traffic congestion is at the junction of Lackawanna and Wyoming Avenues, both of which are double tracked, where all cars pass at the rate of 94 an hour during the peaks. A liberal transfer policy on a five-cent fare is observed on the lines in the city proper, but the zone system of fare-collection prevails on the extensions. During 1913, the company carried 26,242,134 revenue and 4,211,513 transfer passengers over a total car mileage of 3,763,388. Express and baggage cars are run from Old Forge through the city to Forest City. These cars run one way out

Linden Street, which is the thoroughfare running from left to right in the foreground of the cover illustration. The cars are owned by the railway, but are leased to a private carrying concern, and are of the box type, with double sliding doors on each side in the center.

The railway operates several types of passenger cars, among them being cars with plain arch, and also monitor-deck roofs, with various methods of fare collection. The car which is regarded as standard at the present time, is that shown in the illustrations on pages 102 and 103. These are all steel to the window rail, with steel posts. The seating plan is as shown, and the cars are operated on the pay-within basis.



well built and lies in a valley completely surrounded by high
center is Washington Avenue

The J. G. Brill Company, however, is at present building a number of cars which will be adopted as the railway company's standard. These are to be operated on the pay-within basis, and are built with steel underframes and side plates and continuous steel posts. The roof is of the plain arch type,

differing from that of the present car, in that it is continuous from end to end, with a different roof ventilating system from that shown in the illustration. The window system will be similar to that now in use; namely, double sash windows, with stationary upper sashes and lower sashes arranged to raise.

A Correction

IN the March issue of BRILL MAGAZINE an article entitled "Sleeping Cars for Havana," stated that the cars were built by the Wason Manufacturing Company for the Havana Central Railroad. This was an error. The cars were built for the United Railways of Havana. The Havana Central is an American corporation, with offices in New York, where the buying is done for the United Railways and the companies it has acquired. Among these are the Western Railway of Havana, Ltd., the Havana Central Railroad Company, the Havana Terminal Railroad Company and, recently, the Cuban Central Railways.

Semi-Convertible, Stepless Car for Brisbane, Australia

Brisbane Tramways Company

A SHORT time ago The J. G. Brill Company shipped to the Brisbane Tramways Company, Ltd., Brisbane.

Australia, an extremely interesting type of car. The car was shipped whole and, as it has an over-all length of 41 ft. 10 in., lowering it into the hold of any available vessel plying between domestic and Australian ports was out of the question. This fact necessitated special packing and the construction of boxing designed to withstand the strain of a deck voyage during the stormy winter months.

Although the Brisbane car includes a number of the features of the New York and Vancouver stepless cars, it differs from these types in a number of important details. Principal among

these is the fact that it is built of steel to the window rail, while the other cars referred to are all steel.

The underframe of the Brisbane car is made up wholly of steel plates and shapes, so disposed as to give maximum strength of construction with the minimum weight permitted by a generous factor of safety. The sides are girders formed of 3 in. by $\frac{3}{8}$ -in. bars for the top members, 4 in. by 3 in. by $\frac{1}{2}$ -in. angles for the bottom members and 1-16-in. steel plates for the webs. The sill angles are rein-

forced for a distance of 7 ft. at the center by $2\frac{1}{2}$ in. by $2\frac{1}{2}$ in. by $\frac{3}{8}$ -in. angles. Additional stiffness for the side girder is provided by two angles riveted to all members of the girder at each side post. These act also as post supports. The girder is



STEPLESS CAR FOR AUSTRALIA. Brill No. 62 E Special Trucks carry bolster sufficiently low to accommodate low floor



STEPPLESS CAR FOR AUSTRALIA. The broad windows and plain arch roof give a particularly bright and roomy appearance

broken at the doorway over which it is carried by means of two 12 in. by 3-16-in. pressed steel plates, bent to form door posts.

The crossings, of which there are nine, are formed of two 3-in. channels placed back to back. The bolster construction is interesting, consisting of a $3\frac{1}{2}$ in. by 6 in. by $3\frac{1}{2}$ in. by $\frac{3}{8}$ -in. Z-bar, reinforced at the top by a 3 in. by $2\frac{1}{2}$ in. by $\frac{1}{2}$ -in. angle, and at the bottom by two plates, one 3 in. by 7-16 in., extending from end to end, and the other 3 in. by $\frac{3}{8}$ -in., extending for 27 in. along the center. A bulkhead girder formed of a $1\frac{1}{2}$ in. by 5-16-in. bar and a 3 in. by $2\frac{1}{2}$ in. by $\frac{1}{4}$ -in. angle, with a plate 11 in. by

3-16 in. for the web, separates the body of the car from the motor-man's cab and acts in conjunction with the bolster in transferring the side frame load to the center plate. End sills are 4 in. by 3 in. by $\frac{1}{2}$ -in. angles, reinforced by a 5-ft. section of 7-in. anti-climber. Longitudinal members are formed of $2\frac{1}{2}$ in. by $2\frac{1}{2}$ in. by $\frac{3}{8}$ in. and 3 in. by 2 in. by $\frac{3}{8}$ -in. angles, the latter being at the center of the car, forming platform supports. Vestibule stringers are 2 11-16 in. by 3 in. by 2 11-16 in. by $\frac{1}{2}$ -in. Z-bars, extending from bolster to end sill. Floor supports are $1\frac{1}{2}$ in. by $1\frac{1}{2}$ in. by $\frac{1}{4}$ -in. angles.

The side posts are of wood, riv-



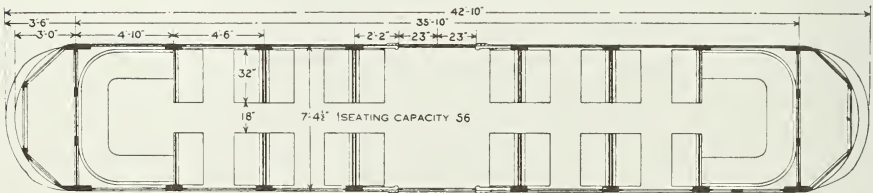
STEPLESS CAR FOR AUSTRALIA. Side doors are manually operated. Car is not arranged for prepayment system

eted to the angle post supports and the web of the side girder. The rafters supporting the plain arch roof are $1\frac{1}{2}$ in. by $\frac{3}{8}$ -in. bars, extending from top rail to top rail, with four 2-in. channels at the center, running from door post to door post.

The window system of this car is especially worthy of note: The side posts are unusually wide, but are placed on 4 ft. 6-in. centers, allowing particularly broad windows, which are of the Brill Semi-Convertible type. At the center of the car are mutually operating, double, sliding doors, arranged for manual operation by either conductor or passengers. Except in stormy weather, the left-hand doors

are left open, the operation of cars in Brisbane being the reverse of that in vogue in this country. For that reason, also, the motorman's cab doors are placed at the left-hand corners. No prepayment features are embodied in this car.

The interior of the car is finished in cherry, with composition headlining. Seats are placed vis-a-vis, except where they extend entirely around the ends of the car, as in the New York type. All have slat seats and perforated veneer backs. Instead of the usual push-button system for signalling the motorman, an extension to the bell cords is provided between each pair of seats. There are no stanchions except at the center of the car, but

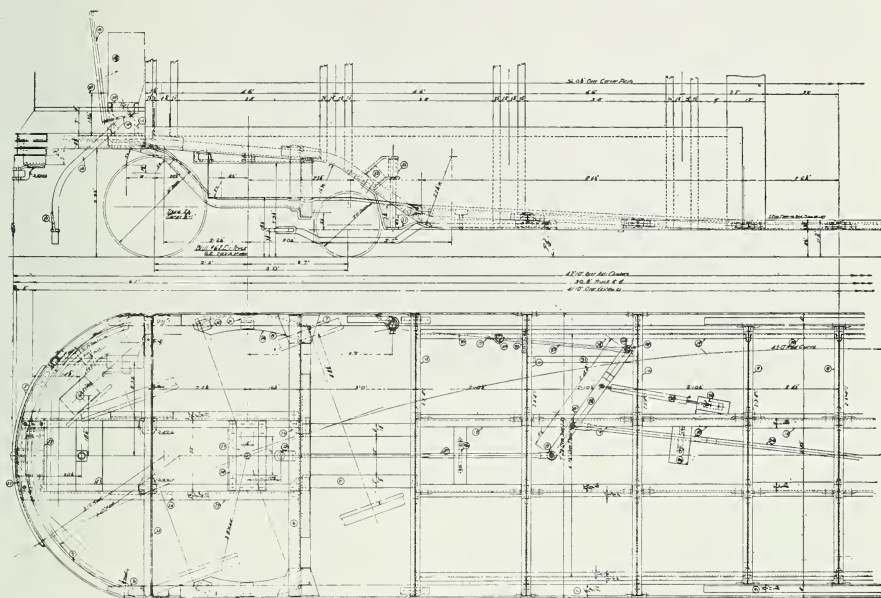


STEPLESS CAR FOR AUSTRALIA. Track to side sill, $8\frac{1}{2}$ in.; side sill to trolley board, 8 ft. 10 in.; floor to headlining, 7 ft. $1\frac{1}{4}$ in. Track to floor, $11\frac{1}{8}$ in. Weight of car body, less electrical equipment, 14,060 lb.

hand straps are provided over the side seats. The floor is level at the center, but is ramped $\frac{1}{2}$ in. to the foot toward the bolsters. The roof is fitted with eight Brill "Exhaust" ventilators.

The Brill No. 62-E Special Trucks used under this car are similar to those on which several

banks of the Brisbane River. The city has numerous manufacturing industries and the metropolitan district has a population, according to the latest available figures, of about one hundred and twenty thousand. The Brisbane Tramways Company, Ltd., has a virtual monopoly of the tramway traffic in



STEPLESS CAR FOR AUSTRALIA. Diagram showing interesting details of the steel underframe construction

low center types are mounted, among them being the Columbus double-deck car described in the March issue of BRILL MAGAZINE.

Brisbane is the capital of Queensland, Australia, and is situated on a series of hills rising from the city and numerous suburbs, but the municipality has the right of purchase in 1920 for an amount to be agreed upon. The lines comprise about fifty-seven miles on single-track basis, and were opened for electric traction in July, 1897.

the city and numerous suburbs, but the municipality has the right of purchase in 1920 for an amount to be agreed upon. The lines comprise about fifty-seven miles on single-track basis, and were opened for electric traction in July, 1897.

The traveling public of a city is like the soil of a farm—neglect it and poor results follow; give it attention and it yields large returns.

Composite Frame Cars for Texas

San Antonio Traction Company

THE American Car Company has finished building an order of 14 composite under-frame, double-end,

pay-as-you-enter cars for service on the lines of the San Antonio Traction Company. The railway operates over about seventy-eight miles of track, and its lines reach Electric Park, a popular amusement resort in the vicinity of San Antonio. The city has a population of 96,600, and is the largest city of Texas. It is the seat of Bexar County, and is about eighty miles southwest of Austin on the San Antonio River at the mouth of the San Pedro. The two rivers, which divide the city into three main sections, are bridged at a number of points. It is the center of an extremely rich live stock and agricultural territory, and has some

fairly important manufacturing interests, chief among which are malt liquors, flour and grist-mill products generally.

The underframe construction of the new cars is very interesting, as will be seen by a glance at the frame plan which accompanies this article. The side sills are of yellow pine, 4 in. by 7¾ in., into which the posts are tenoned. The wooden sill is plated on the outside with a 15 in. by ¾-in. steel plate, reinforced at the top by a 2 in. by ½-in. steel plate, and at the bottom by a Z-bar. The sides of the cars are sheathed with No. 14 sheet steel to the height of the window rail. Center stringers are formed of 6-in. channels. Nine-inch channels form the end sills, and the crossings consist of 4-in. channels. The trap-door supports are 2 in. by 1½ in. by ¼-in. angles. The platforms



CARS FOR SAN ANTONIO. All vestibule doors are arranged to open inward. Cars are mounted on Brill No. 27-G1 trucks



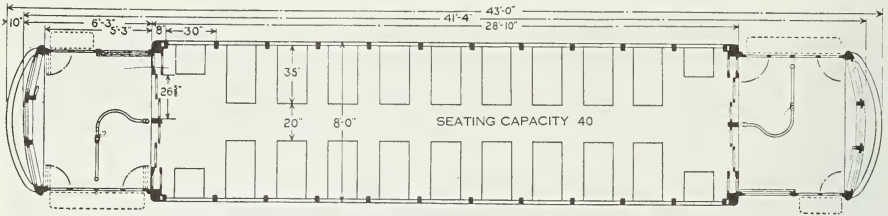
CARS FOR SAN ANTONIO. Telescoping door arrangement in bulkheads permits wide opening for entrance and exit

rest on outside knees of 4-in. channels, arranged in the form of a truss, and on two supports of 5-in. by 3½ in. by 5-16-in. angles. Diagonal braces consists of 3 in. by ¾-in. steel bars. The cars are equipped with inside truss rods, with cast steel posts over the bolsters, which are formed of 8-in. plates. Brill angle-iron bumpers are used.

Wood is used in the body framing, the corner posts being 3¾ in. and the side posts 2¼ in. thick. The sides of the cars are straight. There are 11 double sash windows on each side. These have stationary, arch-head, upper sashes, set in a continuous frame which adds to

the strength of the body construction. The lower sashes are arranged to raise. The roof is of the plain arch type, and is provided with eight Brill "Exhaust" ventilators.

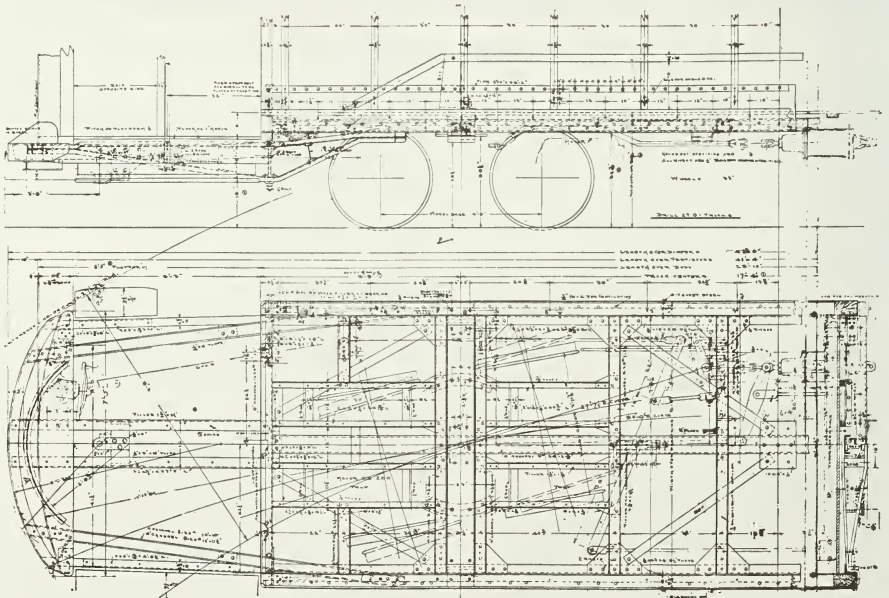
The interior finish is of the No. 1 Palace type, with a composition ceiling in three sections. Cherry is used for all of the woodwork. There are nine transverse seats of the Brill "Winner" type on each side, with seats and backs of cherry slats. In addition, there are two single slat seats at each end of the car. All of the transverse seat-backs are fitted with sockets for the "Jim Crow" signs which are required by law.



CARS FOR SAN ANTONIO. Track to side sill, 2 ft. 10 $\frac{1}{2}$ in.; side sill to trolley board, 9 ft. 1 $\frac{1}{2}$ in.; floor to headlining, 8 ft. 2 $\frac{1}{2}$ in. Track to step, 16 in.; step to platform, 15 in.; platform to floor, 8 in. Weight of car body, less electrical equipment, 17,500 lb.

The arrangement of the doors is interesting. In the center of the bulkhead at each end is a wooden stanchion, on either side of which is a two-section sliding door, each operating independently and running on sheaves into a bulkhead pocket. The round-end vestibules are equipped with double, two-leaf folding doors on the controller side, one hinged to the body corner post

and the other to the vestibule corner post. On the opposite side of the platforms are single, two-leaf folding doors. All doors are operated in conjunction with folding steps, by means of a lever mechanism. Vestibules are fitted with three drop windows in front. The cars are equipped with Brill signal bells, "Dedenda" alarm gongs and "Dumpit" sand-boxes.



CARS FOR SAN ANTONIO. Plan of underframe, showing interesting wood and steel construction

"Narragansett" Trail Cars for Brazil

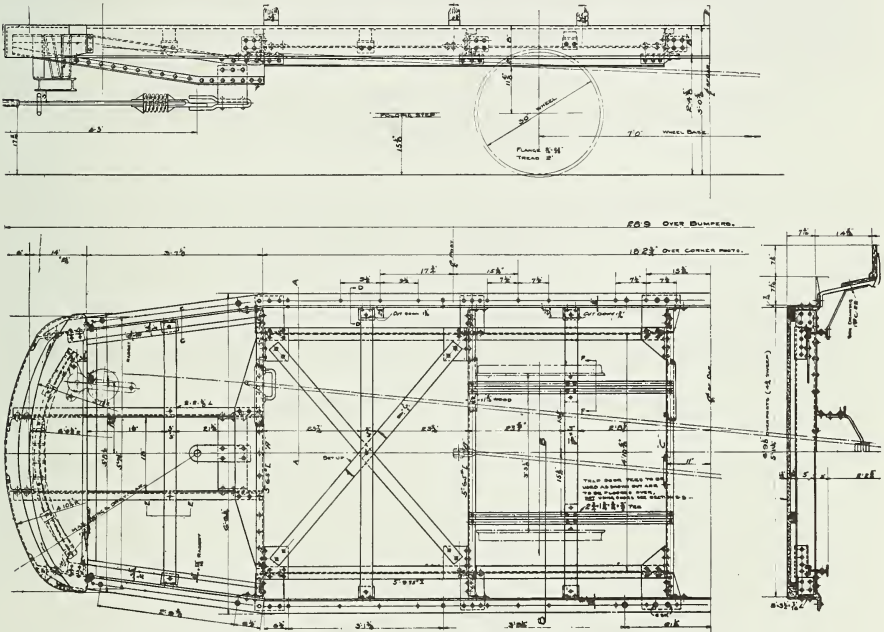
Pernambuco Tramways & Power Company



THE J. G. Brill Company recently completed ten nine-bench "Narragansett" trail cars on the order of J. G. White & Co., London, for the

new Brill No. 74 trail gear, which was described in BRILL MAGAZINE for March, and an illustration of which appears on the back cover of this issue.

Steel is used throughout in the



"NARRAGANSETT" CARS FOR BRAZIL. Plan showing steel underframe construction of the trail cars

Pernambuco Tramways and Power Company, Pernambuco, Brazil. The cars are identical with a number of motor cars recently built for the same railway, except for the omission of electrical equipment not required on trailers, and the fact that they are mounted on the

underframe construction of the trailers. The side sills are formed of 8 in. by 31½ in. by 7-16-in. angles, the frame being tapered at the ends to allow for street clearances. Crossings are formed of 5-in. channels, and the wheel-pieces are 5-in. I-beams. The plat-



"NARRAGANSETT" CARS FOR BRAZIL. Track to side sill, 2 ft. 4 $\frac{5}{8}$ in.; side sill to trolley board, 8 ft. 7 $\frac{7}{8}$ in.; floor to headlining, 7 ft. 7 $\frac{7}{8}$ in. Track to step, 15 $\frac{1}{2}$ in.; step to angle step, 14 $\frac{1}{8}$ in.; angle step to floor, 7 $\frac{3}{8}$ in. Seating capacity, 36. Weight of car body, 9,180 lb.

form knees are composed of a web plate, reinforced top and bottom by 2 in. by 2 in. by $\frac{3}{8}$ -in. angles. Bumpers are 8 in. by 3 $\frac{1}{2}$ in. by 7-16-in. angles. Step angles are of the regular "Narragansett" type.

The cars are provided with round-end vestibules, fitted with three drop windows. Back of these, at each end, is a bulkhead,

also fitted with three drop windows. The roof is of the arch type, with ventilators over the bulkheads. There are four stationary and five reversible transverse benches with slat seats and backs. The interior fittings and decorations are quite elaborate for an open car. The finish is ash, with a cornice of embossed moulding over the side open-



"NARRAGANSETT" CARS FOR BRAZIL. Length, 30 ft.; width over sills, 7 ft. 6 in. Track to side sill, 2 ft. 11 $\frac{1}{8}$ in.; side sill over trolley pedestal, 8 ft. 1 $\frac{1}{8}$ in. Weight of car body, less electrical equipment, 8,700 lb.

ings. This cornice acts as a covering for the striped canvas storm curtains which run in grooves in the sides of the posts. The ceiling is an aluminum sheet, painted light blue, with gold trimmings, relieved and lined up with oak mouldings. The lower steps are of the folding type, built in three sections to conform to the lines of the side sills.

In addition to the trailers, and the motor cars referred to above, The J. G. Brill Company also built for the Pernambuco Tramways and Power Company a single truck flat car for road service. This has a wooden underframe, braced to

carry a load of ten tons. The trolley apparatus is mounted on a wooden pedestal in the center of the car, as shown in the illustration. Six post sockets are provided on each side. The car is fitted with Brill angle-iron bumpers, and is mounted on a Brill No. 21-E truck.

Pernambuco, or Recife, has a population of about one hundred and fifty thousand, and is the capital of the State of Pernambuco, in the northeastern part of Brazil. It is well supplied with trolley service, and is one of the most important commercial cities of Brazil.

A quick method of finding the approximate area of pipe is to square the diameter and take three-quarters of the result

Interurban Cars for Massachusetts Worcester and Springfield

THE Wason Manufacturing Company recently built 10 interurban cars for service in Massachusetts. Of this order, six of the cars go to the Worcester Consolidated Street Railway Company, and four to the Springfield Street Railway Company. The Worcester company operates over about two hundred and eighty-five miles of track, and reaches a number of important towns in the vicinity. A detailed description of the Springfield system was published in the January issue of BRILL MAGAZINE. The ter-

ritory served by both systems is populous and extremely well supplied with manufacturing industries. The new cars have steel underframes, and present a number of interesting structural features.

As will be seen by the frame plan which accompanies this article, the cars have wooden side sills into which the posts are tenoned. These sills are plated on the outside, however, with 15 in. by 5-16-in. steel plates, which are reinforced at the top by a 2 in. by 2 in. by 1/4-in. angle, and at the bottom by a 6 in. by 3 1/2 in. by 3/8-in. Z-bar, an arrangement calculated

to withstand extraordinary strain. The end sills are formed of Z-bars of dimensions similar to those used on the side sills. The crossings consist of 3 in. by 2½ in. by ¼-in. angles. The needlebeams are formed of 5-in I-beams. A 10-in. steel channel forms the center stringer.

The latter are formed of 6 in. by 3½ in. by ⅜-in. angles, reinforced by sections of anti-climber.

The body framing is of wood, with ash corner and side posts and yellow pine belt rails, and the cars have plain arch roofs supported on composite carlines, the metal car-



INTERURBAN CARS FOR MASSACHUSETTS. Bulkhead door pockets have hinged sash with window rods on the outside

Two-inch T-irons are used for the trap door supports.

The platforms are supported on outside knees formed of 6 in. by 3½ in. by ½-in. angles, which are bolted to the side sill Z-bars and to the crownpieces, and on center knees of 4½ in. by 3 in. by ⅜-in. angles bolted to the center stringer channels, crownpieces and bumpers.

lines being forged of mild steel, in one continuous piece from side plate to side plate. Side windows are of the double sash type, the upper sashes being arranged to raise into pockets in the roof, while the lower sashes drop into wall pockets, the sills being made with hinged sections to cover the pocket openings when the sashes are low-



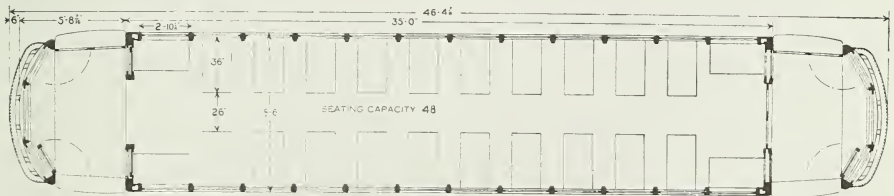
INTERURBAN CARS FOR MASSACHUSETTS. Platform doors fold in against the vestibule.
Steps are stationary

ered. All side windows are protected by metal window rods, which are fitted in sections and hinged to facilitate window cleaning.

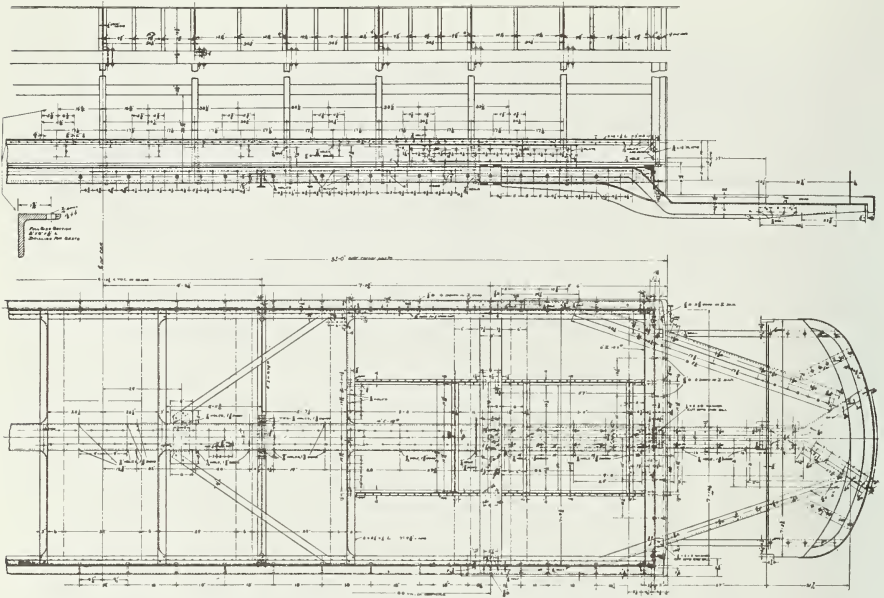
The vestibules are of the round-end type, with three drop windows in front, and are sheathed outside with sheet steel. The inside is panelled with mahogany to conform to the trim. At each end of the car are two vestibule doors of the two-leaf folding type, hinged to the vestibule corner posts and opening inward. The car steps are stationary. Mutually operating, double sliding doors, moving into bulkhead pockets, are provided at the ends of the car. The bulkhead windows have

curtains on the outside to shield the motorman from the light of the interior.

The interior finish of the cars is mahogany, with marquetry ornamentation and composition headlining. The seating plan is as shown in the diagram, with 10 transverse, reversible seats and two longitudinal seats on each side. All seats are upholstered in rattan. The transverse seats are provided with seat-back grab-handles, and poles and handstraps are placed over the transverse seats at each end. The car is lighted by means of a row of incandescent lamps placed on either side of the ceiling.



INTERURBAN CARS FOR MASSACHUSETTS. Track to side sill, 2 ft. 8 1/2 in.; side sill to trolley board, 11 ft. 8 1/2 in.; floor to headlining, 7 ft. 11 7/16 in. Track to step, 15 in.; step to platform, 13 in.; platform to floor, 12 in. Weight of car body, less electrical equipment, 21,150 lb.



INTERURBAN CARS FOR MASSACHUSETTS. Plan of underframe showing use of Z bars on sill plates and as end sills

Twenty-six Passenger Auto-Bus Baker Auto Transit Company

AN auto-bus body built a few weeks ago by The J. G. Brill Company for the Baker Auto Transit Company, South Charleston, Ohio, is almost identical with that turned out by the same builder, a short time ago, for the New York State Railways for operation in the vicinity of Utica, N. Y., as a feeder to the railway lines. The Baker bus is intended for similar use, and will transport passengers between Jeffersonville, South Solon and South Charleston, Ohio, connecting at the last-named town with the lines of the Springfield & Washington Railway Com-

pany, and covering a distance of about fifteen miles on each trip. A three-passenger omnibus, already in use in this territory, has demonstrated the adaptability of the auto-bus to this class of service.

The Baker auto-bus is mounted on a specially built, three and one-half ton Kelly-Springfield chassis, with a wheelbase of 16 ft. 2 in. The bus underframe is of wood, with side and end sill construction conforming to standard car practice as closely as conditions permit. As in the Utica bus, there are seven crossings formed of 3-in. steel channels, placed with the web in a vertical position, thus reduc-

ing the weight of the underframe without minimizing the strength of construction. Between these channel crossings are ash crossings on which the flooring is laid.

The arrangement of the door and steps permits nearly the full width of the floor to be utilized. The two-leaf folding door, which opens outward, closes against the edge of the top step, flush with the corner post, while the lower step folds up against the bottom edge of the door. The entire arrangement is operated by means of a lever mechanism placed at the left side of the driver's seat, which is directly opposite the doorway and is separated from the body of the bus by

a high panelled seat-back. This arrangement permits of one-man operation and allows plenty of room for the movement of passengers.

The interior of the bus is finished in ash, with maple veneer ceiling. It is equipped with a push-button system for signalling the driver, sanitary hand straps, seat-back grab handles, curtains and fixtures of types similar to those used in trolley car equipment. There are ten stationary, transverse seats of Brill manufacture, upholstered in rattan and built without cross frames under the cushions. Seat-back braces, cushion supports and aisle pedestals are of pressed



TWENTY-SIX PASSENGER AUTO-BUS. Stanchion in front with ash panel separates doorway from first seat

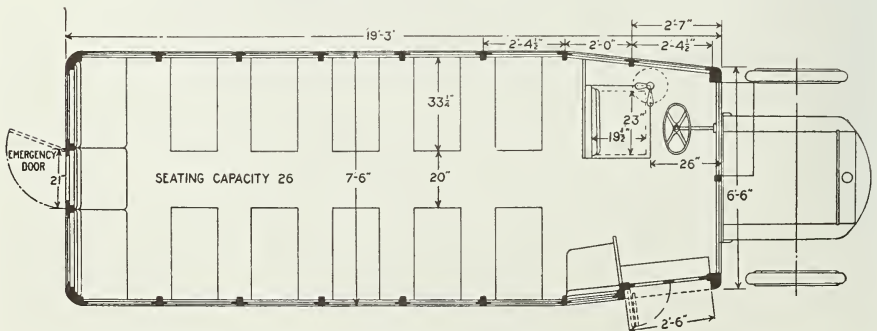


TWENTY-SIX PASSENGER AUTO-BUS. Arrangement of door and step permit use of nearly the full width of the floor

steel, all in one piece, combining strength with light weight. Extending across the entire rear end is a rattan-upholstered bench, with a removable section in the center permitting access to an emergency door. The bus is lighted at night by a row of electric lamps on each side of the ceiling and is heated in winter from the exhaust of the engine.

Windows are of the double sash

type, with the lower sashes arranged to raise, except in the case of the front windows, where the lower sashes are stationary and the upper ones hinged at the top to open outward. A glass hood, projecting from the left-hand window, gives protection to the driver in case of storms, and at the same time keeps the glass clear in the line of his vision. There are two slat ventilators on each side of the bus.



TWENTY-SIX PASSENGER AUTO-BUS. Roadway to side sill, 3 ft. 5½ in.; side sill to roof, 7 ft. 2¾ in.; floor to headlining, 6 ft. 9½ in. Roadway to bottom step, 16¾ in.; bottom to top step, 14 in.; top step to floor, 14 in. Weight of body, 3,700 lb.

Steel Underframe Cars for Johnstown

Johnstown Traction Company

THE G. C. Kuhlman Car Company recently completed delivery of a number of cars built for the Johnstown Traction Company, Johnstown, Pa. The cars have steel underframes

line, the Johnstown Passenger Railway Company, and, in addition to serving the city, it connects Windber with Johnstown, operating over about thirty-six miles of track and reaching Luna and Island Parks.



STEEL UNDERFRAME CARS FOR JOHNSTOWN. Bulkheads consist practically of a single center section into which the doors slide

and, as the accompanying illustrations indicate, are intended for double-end operation with the prepayment method of fare collection. The railway company was formed by the merger of the old Johnstown Traction Company with its leased

Steel plates and structural shapes are used throughout in the underframe construction of the new cars. The side sill is formed of a 15 in. by $\frac{3}{8}$ -in. steel plate, reinforced at the top by a rectangular bar and at the bottom by a



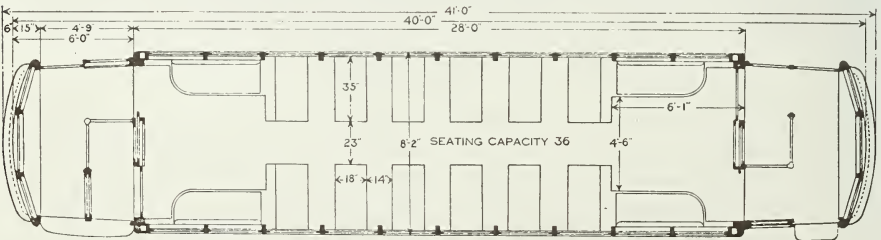
STEEL UNDERFRAME CARS FOR JOHNSTOWN. Rear vestibule doors fold against railings, separating incoming and outgoing passengers

2½ in. by 2½ in. by ⅜-in. angle which serves as support for a wooden sill into which the wooden posts are tenoned. The corner posts are 3⅝ in. and the side posts 2¾ in. thick, with a sweep of 1 in.

End sills are formed of 10-in. channels and the crossings of 4-in. channels, while an 8-in. channel, placed with the flanges projecting downward, forms a center stringer. Additional stiffness is provided, as the accompanying frame plan shows, by means of diagonal braces formed of 3 in. by ¼-in. bars, extending from the junction of the bolster crossing and the side sill to the center of the car. The out-

side platform knees are built up of channels in the form of a truss, while two center platform supports, extending from end sill to bumper, are formed of 6 in. by 3½ in. by ⅜-in. angles. Bumpers are formed of angles of similar dimensions and the trap-door supports are formed of 2 in. by 1½ in. by ¼-in. angles.

The round-end vestibules are sheathed outside with tongued and grooved boards and inside with sheet steel, and are provided with three windows arranged to drop into pockets. The platforms are divided into two sections by means of iron pipe railings and stanchions, and are constructed to sustain

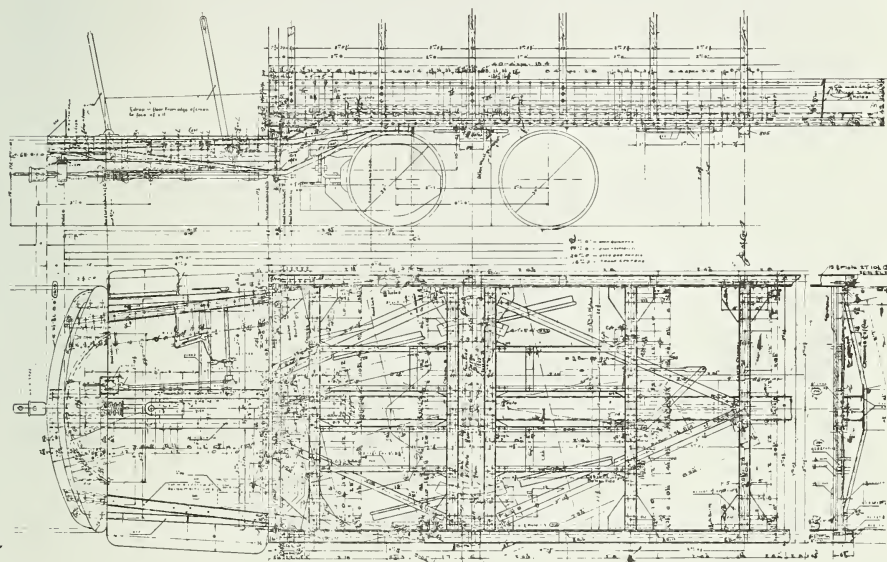


STEEL UNDERFRAME CARS FOR JOHNSTOWN. Track to side sill, 2 ft. 10½ in.; side sill to trolley board, 9 ft. 1 in.; floor to headlining, 8 ft. 0½ in.; track to step, 15½ in.; step to platform, 14½ in.; platform to floor, 11 in. Weight of car body less electrical equipment, but including air brake equipment, 17,900 lb.

a load of 3,500 pounds. The controller side at each end is provided with folding doors, operated in conjunction with folding steps by means of a mechanism controlled by the conductor. On the brakestaff side at each end is a single sliding door controlled by the motorman, and a manually operated step, arranged to lock shut when not in use.

to the door, a section of the longitudinal seat is removable for the purpose of installing a forced ventilation heater during the winter months.

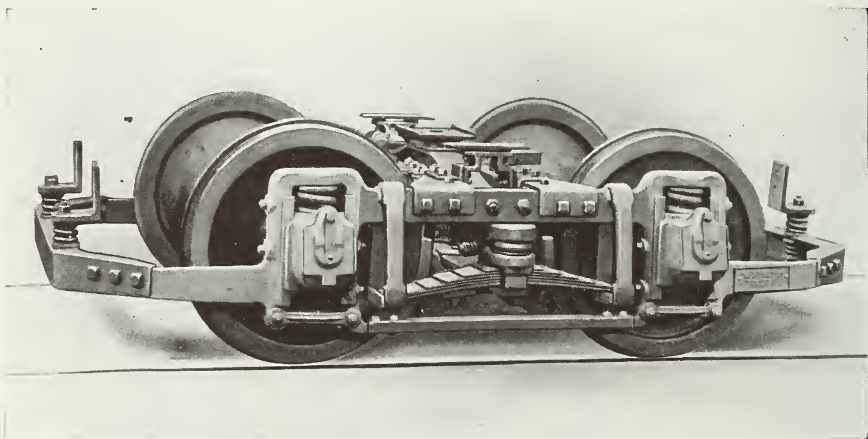
The windows are of the double-sash type, with arched heads. The upper sashes are stationary, while the lower sashes are arranged to drop into pockets, and are protected on the outside by six metal



STEEL UNDERFRAME CARS FOR JOHNSTOWN. Steel underframe plan showing diagonal braces and section at bolster crossing

End doors are arranged to slide into a central bulkhead. The interior of the cars is of the sanitary type for convenience in cleaning, and is finished in mahogany. Reversible transverse seats are fitted with grab handles and, like the longitudinal seats, are upholstered in rattan. Over the longitudinal seats are placed mahogany hand poles with straps. At one end, next

window rods. The roof is of the monitor-deck type, fitted with ventilator sashes of white wire glass, controlled in pairs. The cars are provided with the usual push-button system for signalling the motorman, and are fitted with Brill bells and "Dedenda" alarm gongs. Being intended for both city and interurban service, the cars are mounted on Brill No. 27-GE1 trucks.



NEW TYPE OF BRILL TRUCK. The Brill No. 76-E Truck has the new combination of plate and coil springs

A New Type of Brill Truck

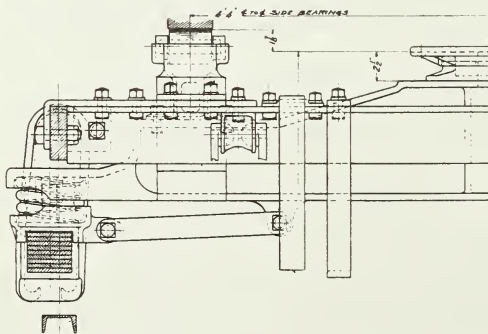
The No. 76-E

A NEW type of Brill truck, the No. 76-E, has been developed, in which the improved plate and spiral spring combination, now a feature of the Brill No. 39-E Single Motor Truck, is an important part. The new truck supersedes the Brill No. 27-G Truck, and is adaptable to a wide range of service. It is capable of a speed of 30 miles an hour, and is particularly suited to combined city and suburban cars.

The spring

system was fully described in the January issue of BRILL MAGAZINE. The No. 39-E trucks, of which it is a part, are in use in Chicago among other places, and most enthusiastic reports have been received of the manner in which it acts. It consists of a spiral spring, interposed between the bolster and

the semi-elliptic spring. This spiral spring absorbs the smaller vibrations which would not be taken by the semi-elliptic, and makes a much easier riding car.

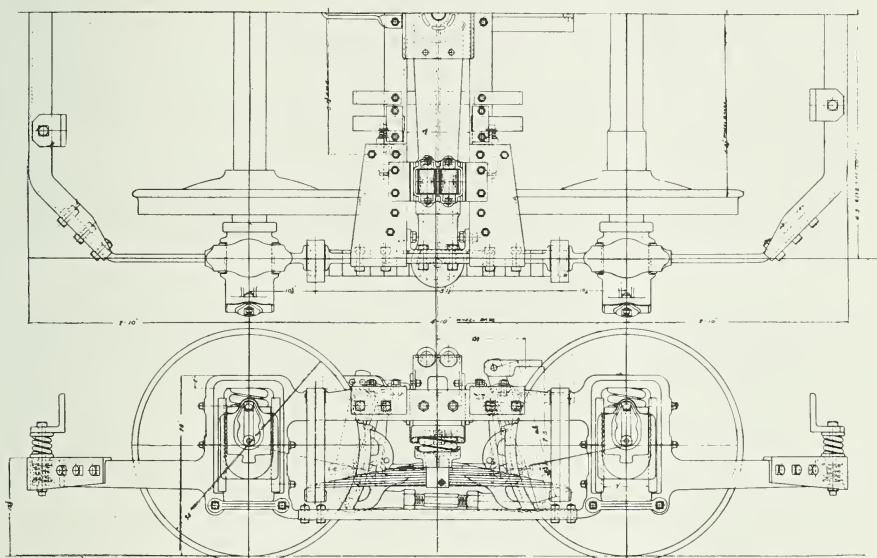


NEW TYPE OF BRILL TRUCK. Diagram showing position of spiral spring cap and seat casting under a light load

The end of the bolster is cast to form a cap for the spiral spring which rests in a seat casting so placed as to come in contact with the bolster when the car is about half filled with passengers. In other words, when the car is running with a light load, there is about $\frac{3}{8}$ -in. play between the spiral spring cap and seat casting.

the wearing of parts and tends to overcome the swaying due to flat bearing on the semi-elliptic spring.

The new type of truck, being of the center-pivotal type, with wheels of equal size, necessarily has a wheelbase of not more than 4 ft. 6 in., in order to permit radiation between car sills, and to clear the car steps on short curves. Nat-



NEW TYPE OF BRILL TRUCK. Top and side view showing spring system and motor suspension brackets in truck end pieces

This closes as the car fills, and brings the semi-elliptic into full play.

This spring combination, which has been patented in this country and abroad, practically eliminates

urally, with so short a wheelbase, the motors cannot be hung between the axles and the transoms, but must be hung by means of supports resting on the truck frame end pieces.

The rapidity and scope of development of city railway car design during the last five years has no parallel in industrial history

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

Did you ever consider those men whose names mean efficiency, achievement, success? Have you noticed that practically everything these men undertake comes out as it should and have you wondered at it?

The reason is these men have the habit of making good. There is no luck about it. They simply have acquired a habit.

That habit—the habit of making good—was acquired by hard work, and the unsparing expenditure of energy. And, by the same means, any man can acquire it.

The successful conduct and development of the railway industry requires the services of thousands of men who are chosen for their fitness for the positions to be filled.

And in proportion to a man's fitness is his career. If a trial proves him to be unfit, he is dropped. If he proves his fitness for a higher post, he gets it in due course.

The opportunities in the railway field are practically without limit. Given a normal brain and the desire and energy to develop it, there is no position to which a man in the ranks may not rise.

It is necessary to the progress of the railway industry that men in the ranks should rise. The industry is not a thing of today alone. Means of transportation will always be in demand and the man most fit will be the man who will lead in supplying the demand.

But first, before he can become a leader, he must acquire the one habit that is characteristic of all leaders—the habit of making good. And making good does not mean doing your work so that it will “get by.” Your work must be done so that it will not only get by, but that it will not “come back.”

Learn your work, strive to improve the methods by which it is done. Study the men above you and their methods. Work, develop your mind, take care of your health, be honest with all men and particularly with yourself, and you will become one of those who have the habit of making good.

Work

MOST men have to work, but comparatively few really like to work; that is, not all men like to do the work they are called upon to do. The other man's work seems so much more interesting. The result is that a good many men do not give a full day's work for a day's pay. It would be difficult, if not impossible, to get these men to admit they are dishonest, but that is what it amounts to.

The Need of Extra Care

WITH the placing in service of open cars comes the necessity for greater care on the part of car crews and especially of conductors. As far as possible, conductors should see to it that the ends of seats are kept free, in order that passengers may board or leave the car without difficulty. The rule against standing on the running board should be strictly enforced and, whenever possible, conductors should assist passengers, particularly women, in boarding or alighting from cars. By following these and such other ideas as may occur to them, conductors will be able to prevent many accidents.

Proper Food

IT is not entirely within the province of the company to prescribe a diet for its men, but in an endeavor to conserve the health and efficiency of employees, especially those forming car crews, a few suggestions may not be out of the way. There is not much time for a full meal in the middle of a run and, as a rule, the men eat very little. That little, however, should be wholesome. Steer clear of pie and milk. The combination is tasty and, for the time being, satisfies the appetite, but it is mighty bad for the stomach. It makes a man heavy and sleepy. So do hot griddle cakes, biscuits and the like. A light meal is best before or during a run. Get your heavy meal at home when your day is over.

Care of the Feet

CAR crews, especially, should take extreme care of their feet. This is very important from the standpoint of health, comfort and efficiency. Change your socks every day. If you are married, this will occasion very little difficulty, and if you are single, it is easy enough to rinse out a pair of socks. Soak the feet every day in warm water and dry them thoroughly. This will remove all soreness and keep them soft. Don't use any of the so-called cures for tired feet. Plenty of soap and water with, possibly, a little borated talcum powder are all you need. Wear sensible shoes with plenty of room in them to spread out your toes. Tight shoes make a man lose interest in everything else.

Brill Magazine Distribution

AS is well known, the publication date of BRILL MAGAZINE is the 15th of the month. Commencing with the May issue, an endeavor will be made to place the magazine in the hands of the entire mailing list of the United States and Canada on the 15th. This, of course, will necessitate a graduated division of the mailing list, but it is believed that the advantage of securing a simultaneous distribution will more than compensate for the additional labor involved. The copies of the magazine for foreign distribution will go into the mail among the first and should be delivered in the United Kingdom, France and Germany not later than the 15th. It will be appreciated if those who receive the magazine, will inform the Publicity Department as to the date on which the May issue reaches them.

Brill Advertisements

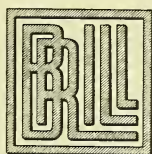
THE Brill advertisements in the *Electric Railway Journal*, *Electric Traction* and the *Street Railway Bulletin* are well worthy of study if only from a pictorial and descriptive standpoint. As is known, the advertising in the *Electric Railway Journal* is run in monthly series, with a change of subject each week. The series for April covers steel cars. The advertising in the April issue of *Electric Traction* deals with interurban cars, while that in the *Street Railway Bulletin* treats of the multiple unit dump car. The *Electric Railway Journal* series for May will deal with the new Brill No. 76-E Truck which is described in this issue. The advertising in the May issues of *Traction* and the *Bulletin* will cover the No. 27-MCB Truck and the No. 39-E Truck, respectively. Each of the publications is treated in a different manner in respect to type, border and illustration, and all of the copy, borders and illustrations are prepared by the Publicity Department.

New Brill Agents

ATTENTION is directed to the fact that Shackleford & Company, Calle St. Martin, 201, Buenos Aires, are agents for The J. G. Brill Company in Argentine and Uruguay, vice Federico H. Bagge.

Changes of Address

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



The J. G. Brill Company

Main Office
Philadelphia, U. S. A.

Cable Address: "BRILL," Philadelphia

London Office: 110 Cannon Street, E.C.

Cable Address: "AXLES," London

American Car Company, St. Louis, Mo.

G. C. Kuhlman Car Co., Cleveland, Ohio

John Stephenson Co., Elizabeth, N. J.

Wason Manuf'g Co., Springfield, Mass.

Cie. J. G. Brill, 49 Rue des Mathurins, Paris

Cable Address: "BOGIBRIL"

Agencies

Pacific Coast

PIERSON, ROEDING & Co., 118 New
Montgomery St., San Francisco;
Los Angeles, Portland, Seattle

Australasia

NOYES BROTHERS, Melbourne, Sid-
ney, Dunedin, Brisbane, Perth

Belgium & Holland

C. DUBBELMAN, 24 Place de Lou-
vain, Brussels

Argentine & Uruguay

FEDERICO H. BAGGE, Calle San
Martin 201, Buenos Aires

Natal, Transvaal & Orange River Colony

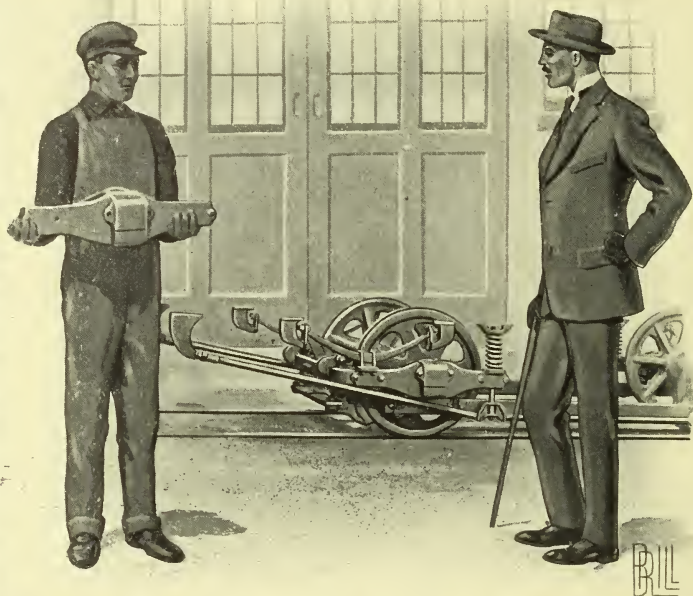
THOMAS BARLOW & SONS, Durban,
Natal

China

SHEWAN, TOMES & Co.
Hong Kong, Canton, Shanghai

Italy

GIOVANNI CHECCHETTI
Piazza Sicilia, 1, Milan



THE BRILL No. 74 TRUCK

DESIGNED for modern trail car service, the Brill No. 74 Truck, (Patented), is the result of a careful development of the running gear type of truck. The main feature is the journal box, which is cast with extensions to support the body coil spring at one end and the semi-elliptic at the other. By casting a body coil spring seat at each end of the journal box and providing an additional casting to fit into this seat and serve as a seat for the semi-elliptic spring, the journal box is made interchangeable. The brake rigging has a center pull, vertical lever and includes the Brill Half-Ball Brake Hanger

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA

BRILL MAGAZINE

SMITHSONIAN
OCT 30 1975
LIBRARIES



Canadian Square
Grand Rapids, Mich.



THE MULTIPLE DUMP CAR

OUR Wason Plant is now building ten of these dump cars for The Connecticut Company, supplementing an initial equipment furnished a few months ago. The cars are built of steel, with the exception of the cabs. The dumpies are motor-operated, and two men only are required to handle the car. The advantage of this in roadbed construction or in work where large quantities of material have to be handled rapidly and in the most economical manner, is plainly apparent. The cars can be built with practically any number of dumpies.

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA



T. B. Buchanan

GENERAL MANAGER, VIRGINIA RAILWAY & POWER COMPANY

Capacity

This quality, as applied to a man's ability to undertake and perform, is one of that class which is easy to observe, but difficult to define. Also it is a term frequently misapplied.

Its manifestation does not depend entirely upon mentality, nor yet upon physical or moral attributes. And yet, a man who is lacking in any one of these, is lacking in capacity.

The man of capacity is he whose mind has been broadened by observation and study, and whose habits of living and thinking have given him the moral and physical health to perform properly that which is set for him to perform.

May 15, 1914

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C. B. Buchanan



B. BUCHANAN, general manager of the Virginia Railway and Power Company, with headquarters at Richmond, Va., was born at Okolona, Mississippi, and, after completing a commercial education, started on his business career with the Mercantile Bank of Memphis, in 1889. He went from there to the electric railway field and was treasurer and auditor of the Memphis and Raleigh Springs Railroad Company in 1891. After the sale and consolidation of the city and suburban railways, in Memphis in 1893, he took up the construction and operation of railways and lighting plants throughout the State of Mississippi, and later managed the railway and lighting plant at Meridian, Mississippi. Leaving there in 1901, he accepted positions as division superintendent of the Richmond Passenger and Power Company and general agent of the Richmond and Petersburg Electric Railway Company, and later served the several consolidated companies in Richmond as superintendent of transportation. With the reorganization of the railway and lighting properties in Richmond, Manchester and Petersburg by the Virginia Railway and Power Company, July 1, 1909, the title of general manager was abolished and Mr. Buchanan was appointed operator of railways with the title of general superintendent of railways, July 1, 1911. The railway, lighting and gas properties of the Norfolk and Portsmouth Traction Company, operating in Norfolk, Portsmouth and Suffolk, were purchased by the Virginia Railway and Power, and Mr. Buchanan was appointed to his present office of general manager of the combined properties and vice-president of the gas company.

Conditions Which Govern the Type of Car for City Service

Grand Rapids, Michigan

GRAND RAPIDS is the second city in point of population and commercial importance in the State of Michigan.

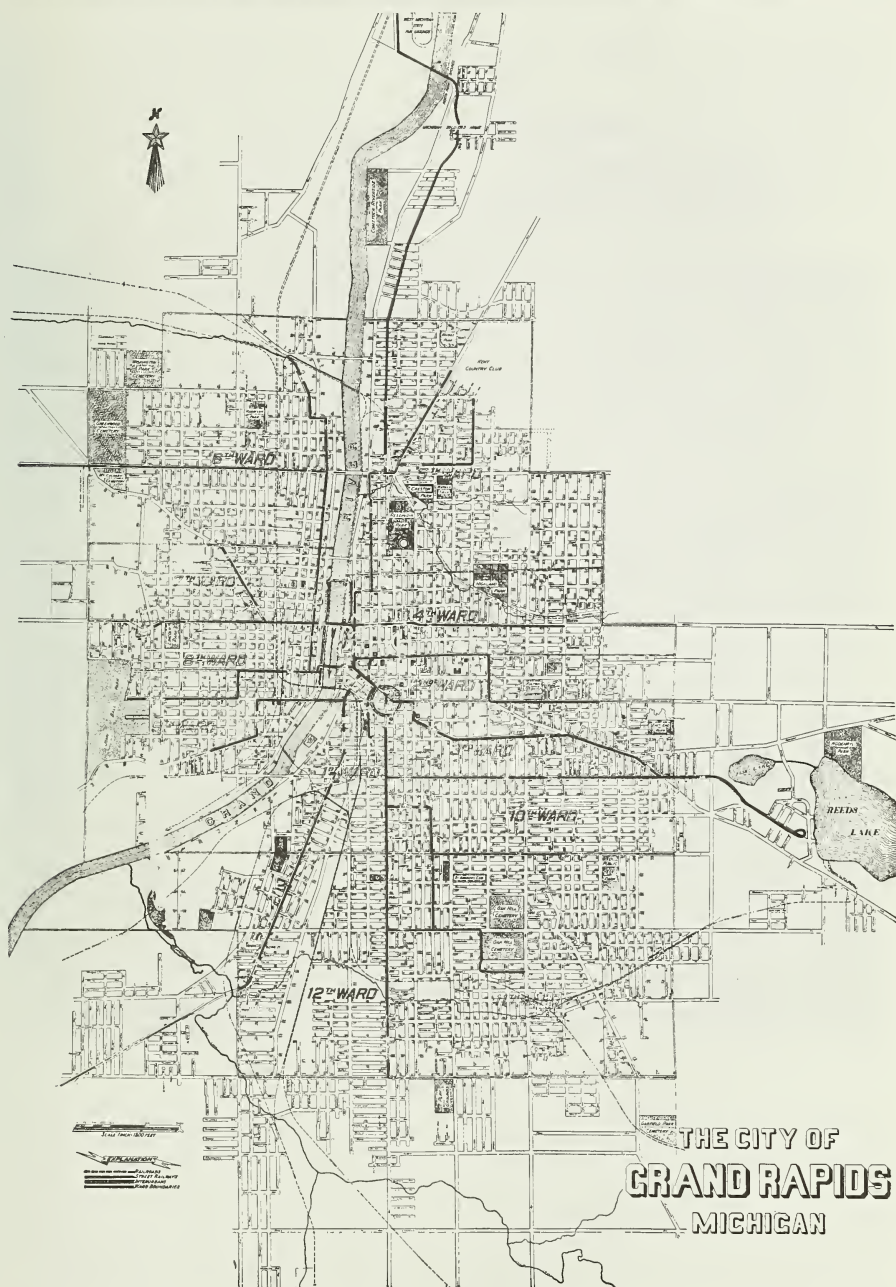
It is also the county seat of Kent County, and is situated at the head of navigation on the Grand River, about thirty miles from Lake Michigan and 145 miles northwest of Detroit. The city had 112,571 inhabitants at the time of the last census, but has grown considerably since then.

The site of the city was formerly a village of the Ottawa Indians. It is located in a valley which, at this point, is about two miles wide, with a range of hills on either side. The Grand River flows through the center over a limestone bed, falling about eighteen feet in a mile. In 1824 a mission was established for the benefit of the Indians, and in 1833 a saw mill was built. This marked the beginning of what is now the city, and the next few years saw a rapid growth of the settlement, which was organized as a town in 1834, and incorporated as a village in 1838. The city charter dates from 1850.

Although both sides of the river are lined with mills and factories, the principal business blocks are nearly all situated along the range of hills to the east. Magnificent

views are commanded from these hills, and it is here that the finest residences are built, those on the west side of the river being less pretentious and built, for the most part, on bottom lands. Formerly considerable damage was done on both sides of the river at periods of high water, but the construction of flood walls along the river banks has practically eliminated danger from this source.

The Grand River is navigable below the rapids, thus establishing direct waterway communication with Lake Michigan. The rapids furnish an abundance of power, the river being dammed at a point slightly north of the center of the city, from whence power canals are run on both sides of the stream. This feature has encouraged the location of important manufacturing interests in Grand Rapids and, as is well known, the furniture industry of the city has today a world-wide reputation. Other important industries include flour and grist mills, foundries and machine shops, planing mills, agricultural implement and wagon works and barrel factories. A very large part of the world's production of carpet sweepers comes from Grand Rapids. In addition to manufactured products, the city enjoys a very large trade in fruits,



GRAND RAPIDS TRAFFIC CONDITIONS AND CARS. The system of laying out and numbering the streets is admirably planned.

vegetables and cereals, being the principal shipping point of a large agricultural district.

The transportation facilities of Grand Rapids are thoroughly adequate, direct rail communication with outside points being fur-

There are numerous charitable and religious institutions and hospitals in the city, and the park system is admirably planned and efficiently administered.

The streets are laid out, as nearly as possible, on a rectangular



GRAND RAPIDS TRAFFIC CONDITIONS AND CARS. Seat-back grab handles are omitted but plenty of straps are provided.

nished by the Lake Shore & Michigan Southern, the Michigan Central, the Grand Trunk, the P  re Marquette, and the Grand Rapids & Indiana, while a system of interurban electric lines provides ample service for the surrounding country.

plan, those running in a general easterly and westerly direction being called streets, while those running north and south are termed avenues. All short or disconnected thoroughfares, less than a block in length, are designated as courts when they run east and west, and

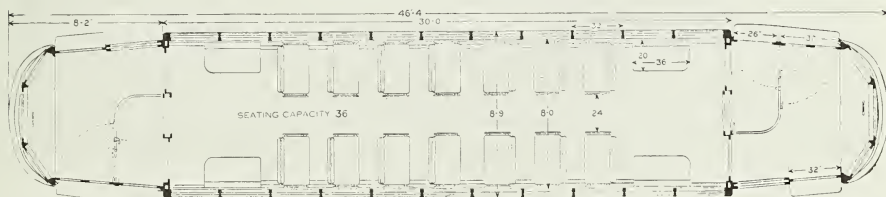


GRAND RAPIDS TRAFFIC CONDITIONS AND CARS. Cars are mounted on Brill No. 27-G Trucks and carry mail box on one end.

as places when running north and south. Division Avenue north to the point where it connects with Taylor Avenue, and the latter thoroughfare extended north, form the base from which all street numbers start east and west, while Fulton Street forms the base from which all north and south thoroughfares are numbered. All streets and avenues are numbered on the basis of one hundred to the block, and eight full blocks are

arbitrarily held to constitute a mile. As will readily be appreciated, this system of denominating and numbering streets makes for a simplicity in ascertaining direction and locality, which might be followed by a number of much larger municipalities with very good results.

This arrangement of the streets also greatly facilitates the extremely efficient street railway service of the city, which is pro-



GRAND RAPIDS TRAFFIC CONDITIONS AND CARS. Track to side sill, 2 ft. 9 in.; side sill to trolley board, 9 ft. 2 in.; floor to headlining, 8 ft. 1 in.; Track to step, 18 in.; step to platform, 13 in.; platform to floor, 10 in. Weight of car body, less electrical equipment, 22,880 lb.

vided by the Grand Rapids Railway Company. As the map on page 131 indicates, all sections are well covered, the present system embracing about sixty-five miles of track, although the lines are being extended as rapidly as conditions warrant. Of this, about nine miles are single track. The maximum grade on the system is 10 per cent., and the radius of the shortest curve is 30 feet.

The principal business thoroughfares are Division and Monroe Avenues and Canal Street. Naturally, these form also the principal city lines. The point of heaviest traffic is at Campan Square, a view of which forms the illustration on the front cover of this issue. Practically all city lines center at this point, and during the periods of rush-hour travel, between 6.20 and 8.00 o'clock in the morning, and 4.30 and 6.15 o'clock in the evening, from 130 to 150 cars an hour pass through the square. The company keeps 85 cars in normal daily operation. Figures regarding car mileage are not available at this time, but an idea of the company's business may be obtained from the fact that 25,820,000 revenue passengers were carried during 1913. The company has a very liberal transfer policy and, in addition to the population of the city, serves also a tributary population of about fifteen thousand.

Exclusive of officials and office force, the average number of men employed by the company during 1913 was 672. These men, as is

the case on most systems, are selected with great care, and are held to very strict personal accountability for their work. The policy of safety, efficiency and courtesy is rigidly enforced, but the conditions of service are made as favorable and attractive as possible. The company has provided club rooms at two of the car houses, where the men are in entire charge, and in which frequent entertainments are given, to which the men's families are invited. The company also maintains a co-operative association for the purchase of food and necessities.

At Reeds Lake, which, as the map shows, is in the eastern part of the city, the railway owns and operates Ramona Park, a pretentious amusement resort containing a fine theater, as well as the usual attractions. The park is reached by means of a double-track line ending in a loop at the park gates. Started originally as a summer park, Ramona has gradually grown to be extremely popular in winter, the lake and the hills affording ample opportunity for winter sports. In addition to this resort, the company has developed North Park in another section of the city. Several parks outside the city limits are reached by means of the city system, and the lines of the Grand Rapids, Holland & Chicago Railway, an interurban 81 miles long, with which the interests of the Grand Rapids Railway Company are allied.

The standard car in use on the railway company's system is ad-



GRAND RAPIDS TRAFFIC CONDITIONS AND CARS. Intersection of Monroe Avenue and Michigan Street. One of the busiest points



GRAND RAPIDS TRAFFIC CONDITIONS AND CARS. Monroe and Division Avenues.
An important point on the longest haul

mirably suited to the service, being of the double-end, prepayment type shown in the illustrations on pages 132 and 133. The company owns, at present, 147 of these cars, a number of which were built by the American Car Company.

These cars have wooden underframes, properly reinforced with steel, the side sills consist of yellow pine, plated with 15½-in. by ¾-in. steel plates. These plates are reinforced at the top and bottom with angles of suitable size, the whole having the general characteristics of a Z-bar. The end sills and crossings are of oak and the former are reinforced with steel plates which are bent at the ends and bolted through the side sills. The platforms are supported on knees formed of Z-bars, which are reinforced at the end sills with 7-in. by ¾-in. steel plates.

The vestibules are of the round-end type, and are provided with three drop windows in front. They are sheathed outside, to the height of the window sill, with sheet steel.

On one side of each vestibule is a double swinging door, which is operated by the conductor by means of a lever mechanism, located near the bulkhead. On the opposite side of each vestibule is a single sliding door, which is controlled by the motorman by means

of a mechanism located near the air-brake control. All of these doors are operated in conjunction with folding steps. There are two sliding doors in each bulkhead. These slide into a center pocket, and can be operated either manually or by the conductor by means of suitable mechanism.

The body framing is of ash, as are also the rafters which support the monitor-deck roof. The roof is provided with the usual pivoted ventilator sash. The interior finish of the car is cherry, with a head-lining of birdseye maple veneer. This is suitably decorated and striped. The windows are of the double sash type, with stationary upper sashes and lower sashes which are arranged to drop into pockets. Hinged sill sections form covers for the window pockets. Transverse seats are reversible and, contrary to the almost general practice, are not provided with seat-back grab handles. The cherry hand-rails on either side of the car, however, are fitted with an abundance of sanitary hand-straps. The transverse seats, as well as the longitudinal seats at each end of the car body, are upholstered with woven rattan. The usual push-buttons for signalling the motorman are installed in each side post.

As a city railway system tends to centralize business and spread out the residence area, its action is both centripetal and centrifugal. It is serving the best interests of the community in opposite directions.

One Hundred Cars for the Chicago Surface Lines

Steel Underframes

THE J. G. Brill Company has just completed an order of 100 cars for the Chicago Surface Lines. These cars have steel underframes, and are arranged for operation on the pay-as-you-enter system of fare collection. The trucks used are of the Brill No. 39-E Single Motor type, embodying the combination coil and plate spring system, which is

now standard on this type of truck, and which was described in the January issue of BRILL MAGAZINE. Extremely favorable reports have been received regarding the operation of these trucks on the cars already in service in Chicago and elsewhere.

As indicated by the diagram which accompanies this article, steel shapes and plates are used throughout the underframe con-



ONE HUNDRED CARS FOR CHICAGO. Platform railing can be reversed to serve as guard for the motorman



ONE HUNDRED CARS FOR CHICAGO. In addition to interior seating accommodations, seats for six passengers are provided on platforms

struction of these cars. Side sills are in the form of a girder, built up of a 3-16-in. plate, with a 2 in. by 5-16-in. flat bar for the top member, and a 2 in. by 2 in. by $\frac{1}{4}$ -in. angle at the bottom. These girders are stiffened by $11\frac{1}{2}$ in. by $11\frac{1}{2}$ in. by $\frac{1}{4}$ -in. angles riveted vertically. Post-brace angles of similar size are riveted to the sills for fastening the body corner posts. Three holes are cut in the sill plate at the center, for air duct connection with the transverse seat heaters. The side plate is reinforced at these points by one-piece steel plates. Overhead truss bars of $2\frac{1}{4}$ in. by $\frac{3}{8}$ -in. steel are supported at the bolsters by posts formed of 2 in. by 2 in. by $\frac{3}{8}$ -in.

angles, riveted to the side plates and resting on the sill angles. End sills are formed of 10-in. channels, placed with the back toward the center of the car. The bolsters are cast steel, $9\frac{1}{8}$ in. deep at the center, and designed to carry a load of 11,000 lbs. at each end, when supported at the center. The ends of the bolsters are ribbed down under the side sills. Gibs are cast on at the center for the purpose of attaching the platform center knees.

Between the bolsters are five cross sills, built up in arch truss form, of two $1\frac{3}{4}$ in. by $1\frac{3}{4}$ in. by $\frac{1}{4}$ -in. angles, fastened at the center and midway between the center and the ends by $\frac{1}{4}$ -in. plates. The



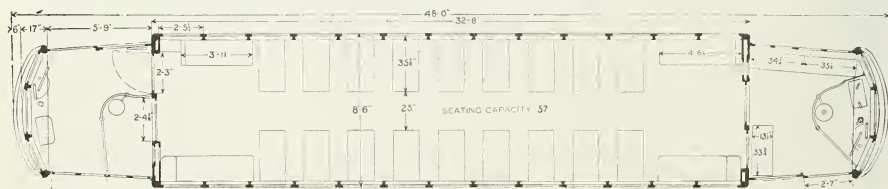
ONE HUNDRED CARS FOR CHICAGO. The cars are mounted on Brill No. 39-E Trucks with the recently adopted spring system

ends are joined to the side sills by 8 in. by 6 in. by $\frac{3}{8}$ -in. angles. The underframe is braced between crossings, and between the bolsters and adjacent crossings by $1\frac{3}{4}$ in. by $1\frac{3}{4}$ in. by $\frac{1}{4}$ -in. angles, gusseted to the transverse members. The corners of the underframe are braced by angles gusseted to the side and end sills, and to the platform center knees at the bolsters.

The platform side knees are formed of 5-in. channels, reinforced top and bottom at the end sills, and also where the top flange and a part of the web are sheared off to allow for the oak crown-pieces by 2 in. by 2 in. by $\frac{3}{8}$ -in. angles. These knees are riveted to the side sills and secured to the bumper by angle brackets. Cen-

ter knees are 4-in. I-beams extending from bumper to bolster, riveted to the bolster gibs, and fastened to the bumper by means of angles. The platform framing is braced by 3-in. channels, fastened to the side knees by angles, and to the center knees by $\frac{1}{4}$ -in. plates. The bumpers are formed of 8-in. channels.

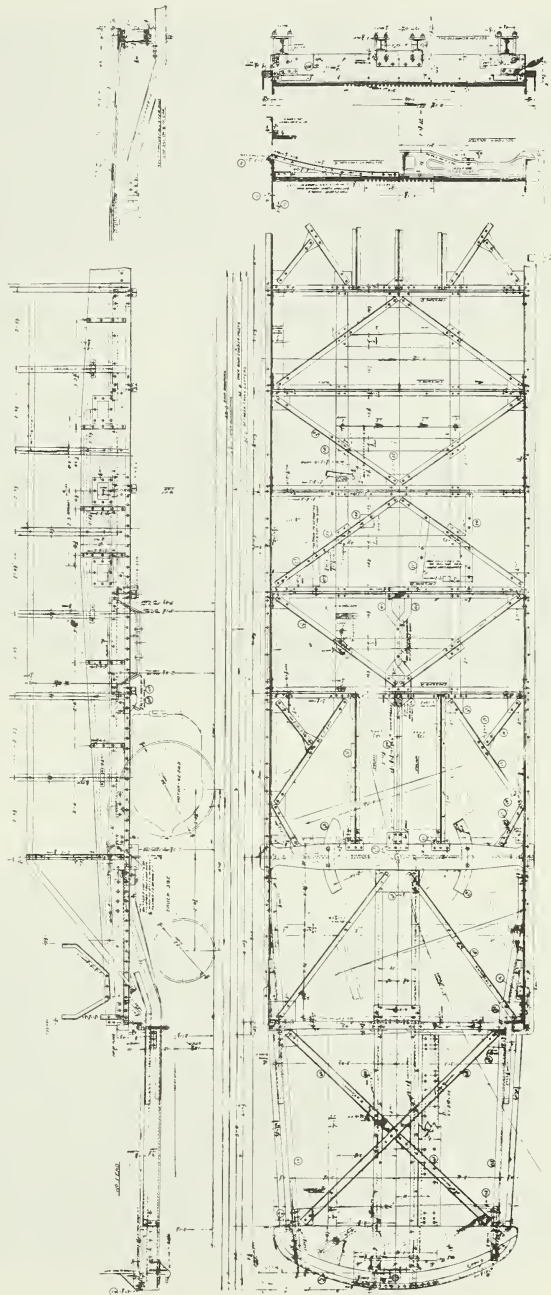
Corner and side posts and belt-rail are ash. The body side panels are poplar, sheathed with sheet steel. The bulkhead headers are ash, cut out in order to reduce weight, and the bulkhead posts are also of ash, the center post enclosing a 2 in. by $1\frac{1}{2}$ -in. T-iron. The roof is of the plain arch type, supported on composite carlines. The ventilating system is interesting, and includes, in addition to a Brill



ONE HUNDRED CARS FOR CHICAGO. Track to side sill, 2 ft. 6½ in.; side sill to trolley board, 9 ft. 1¼ in.; floor to headlining, 7 ft. 9¼ in. Track to step, 13½ in.; step to platform, 12 in.; platform to floor, 10 in. Weight of car body, including electrical equipment, 30,720 lb.

"Exhaust" Ventilator over each hood, a fan motor connecting with an exhaust chamber, ceiling registers and the ducts for connection between the three holes cut in the side girders and the heaters under the transverse seats.

Round-end vestibules have three double sash windows in front. The center and left-hand upper sashes are arranged to raise, while that at the right is stationary. All lower sashes are arranged to drop to any desired point. Vestibules are panelled inside with sheet steel. Entrance and exit doors are of the double, two-leaf folding type, one hinged to the vestibule corner post, and the other to the body corner post. These doors are panelled with glass for about two-thirds of their height, and are operated separately or in unison, in conjunction with folding steps, by means of a mechanism controlled by the con-



ONE HUNDRED CARS FOR CHICAGO. Diagram of steel underframe, showing detail of platform knee and pressed steel bolster

ductor. On the opposite side of the platform is a single sliding door, also operating in conjunction with a folding step.

The interior of the car is finished in cherry, with birch veneer ceiling. Windows are double sash, with the stationary upper sashes set in a continuous frame. Lower sashes are arranged to raise. The corner and side posts are fitted with locks designed to hold wire mesh screens or storm sashes, ac-

cording to the requirements of the season. Bulkheads are fitted with one swing and one sliding door.

There are nine transverse reversible seats and two folding, longitudinal seats on each side of the car. These are rattan upholstered. The transverse seats are fitted with grab handles, and hand straps are provided over the longitudinal seats. On the platforms are folding, slat seats to accommodate six passengers.

The "Retriever" Signal Bell gets its name from its remarkable ability to retrieve the bell cord.

Prepayment Car for Iowa

Centerville Light & Traction Company



THE American Car Company has recently completed a wooden underframe pay-as-you-enter car for the Centerville Light and Traction

Company, Centerville, Ia., which presents a number of interesting features.

The car has yellow pine side sills, plated with 7-in. by $\frac{3}{8}$ -in. steel, as the diagram indicates.



CENTERVILLE PREPAYMENT CAR. The car is mounted on a Brill No. 21-E Truck with an 8-ft. wheelbase



CENTERVILLE PREPAYMENT CAR. One longitudinal seat at each end is hinged to allow for conductor's position

The end sills are of oak, reinforced with 5-in. by 1/4-in. steel plates. The cross joints are also of oak, supported at the side sills by wrought-iron brackets. Bumpers are of oak, faced with 6-in. by 3/8-in. steel plates. Platform knees are reinforced with 4-in. by 3-in. by 1/2-in. angles. The upper truss rods are 2 in. by 3/8 in.

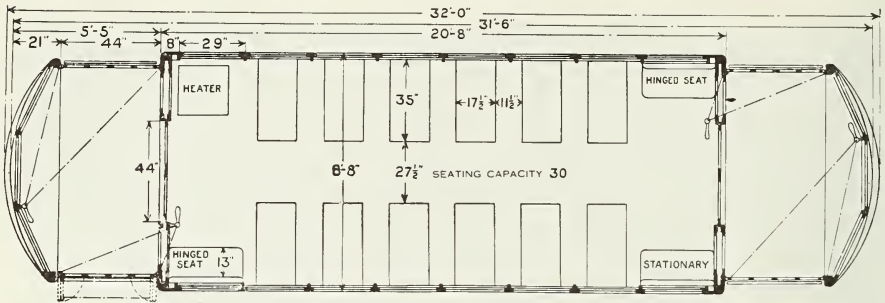
Wood is used throughout in the body framing, the corner posts being 2 1/2 in., and the side posts 1 1/2 in. thick, with a sweep of 2 1/2 in. The roof is of the plain arch type. Vestibules are round end, with three windows in front, that in the center being a single sash, while the others are double sash. The side

windows are of the double sash, arched head type, with stationary upper sashes and lower sashes arranged to raise.

The car is intended for double end operation, and has double two-leaf folding doors at all corners. These are hinged to the body and vestibule corner posts, and are arranged to fold outward. All vestibule doors are controlled by a lever mechanism operated by the conductor and located inside the car, next to the left-hand bulkhead door post. Folding steps operate in conjunction with the doors. Bulkhead doors are of the mutually operating, double sliding type.

Cherry is used in the interior

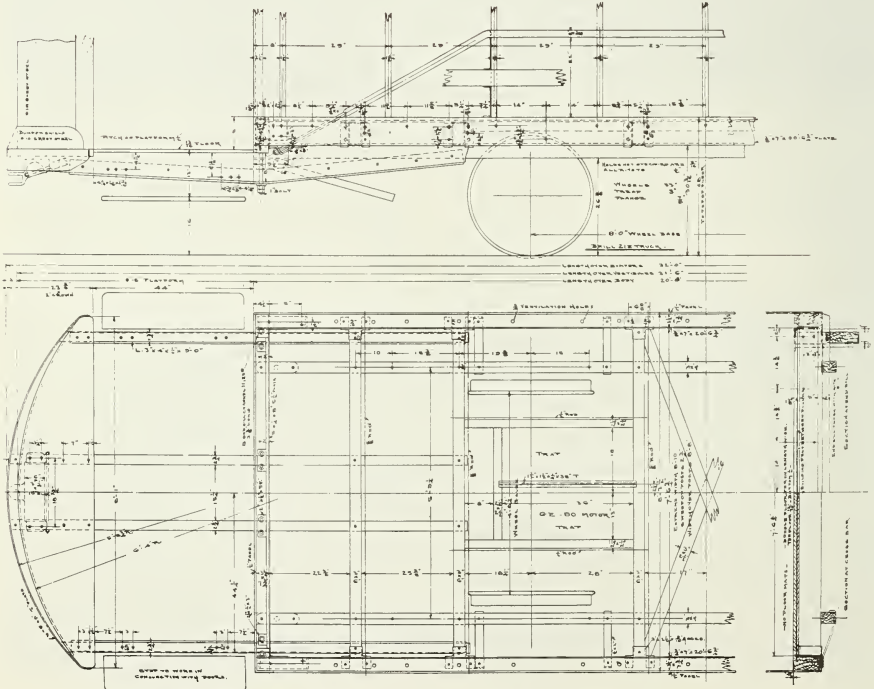
BRILL MAGAZINE



CENTERVILLE PREPAYMENT CAR. Track to side sill, 2 ft. 6 ⁹/₁₆ in.; side sill to trolley board, 8 ft. 10 ¹/₂ in.; floor to headlining, 7 ft. 11 in. Track to step, 16 in.; step to platform, 13 in.; platform to floor, 9 in. Estimated weight of car body, less electrical equipment, 12,500 lb.

finish, and the headlining is composition. There are six Brill "Winner" slat seats on each side. Two longitudinal slat seats are provided on one side and one on the other.

The car is equipped with the usual push-button system for signaling the motorman, and has a forced draft heater. Brill "Dump-pit" sand boxes and "Dedenda" alarm gongs are used.



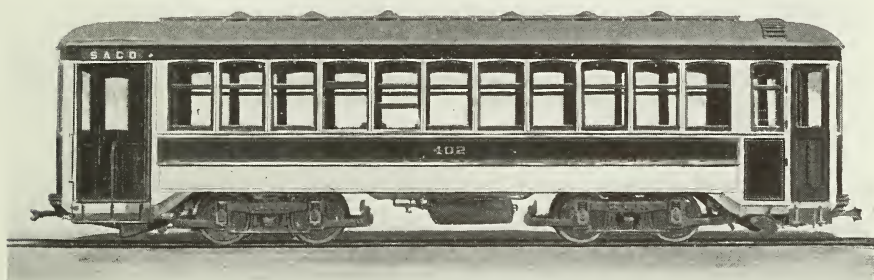
CENTERVILLE PREPAYMENT CAR. Plan of underframe, showing steel reinforcement of wooden members

Steel Underframe Cars for Portland

Cumberland County Power & Light Company

AN order for ten steel underframe cars for the Cumberland County Power and Light Company, Portland, Me., has recently been completed by the Wason Manufacturing Company. The railway company, in addition to running the city lines in Portland, connects a number of surrounding towns and villages, and

ber a 5-in. by $3\frac{1}{2}$ -in. by $\frac{3}{8}$ -in. angle, and for a top member a 3-in. by 2-in. by $\frac{1}{2}$ -in. angle, with 36-in. by $\frac{1}{8}$ -in. plates forming the web. The end sills are 10-in. channels, placed with the flanges facing outward and riveted to the side plates by means of special steel castings. An 8-in. channel, laid with the flanges downward, forms a center stringer, to which, and to the side

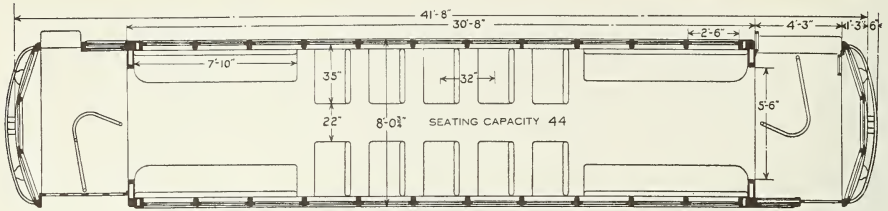


STEEL UNDERFRAME CARS FOR PORTLAND. Cars are mounted on Brill No. 51-E1 Trucks and are equipped with Brill track scrapers

operates over about one hundred and ten miles of track. It owns Riverton and Cape Cottage Parks, two popular resorts in the vicinity, and, in addition to its passenger equipment, has 17 snow plows. The company also furnishes current for lighting.

The cars recently delivered are built of steel to the window rail. The side construction consists of a girder having for a lower mem-

sills, are gusseted the 4-in. channels which form the crossings. Longitudinal floor supports are $1\frac{1}{2}$ -in. by $1\frac{1}{2}$ -in. by 3-16-in. angles. The diagonal braces, indicated in the accompanying frame plan, are 4-in. by $\frac{3}{8}$ -in. bars. These extend from the center crossings to the intersection of the channels next to the bolsters, and also from the channels inside the bolsters to the end sills.



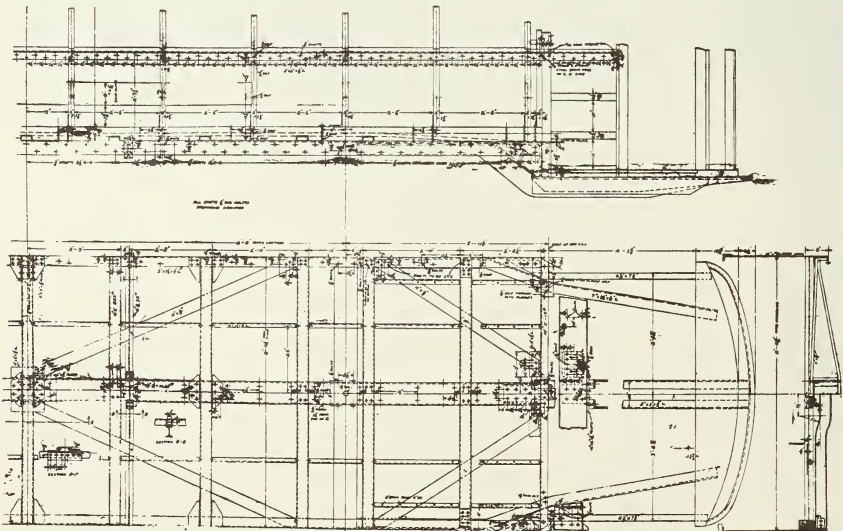
STEEL UNDERFRAME CARS FOR PORTLAND. Track to side sill, 2 ft. 7 in.; side sill to trolley board, 9 ft. 5 in.; floor to headlining, 8 ft. 3 1/2 in. Track to step, 13 in.; step to platform, 13 in.; platform to floor, 10 in. Weight of car body, less electrical equipment, but including all air brake equipment except compressors, 20,900 lb.

The bolsters are built up in truss form of steel plates. Outside platform knees, formed of 7-in. by 3 1/2-in. by 1/2-in. angles, extend from bolsters to the platform end pieces, while the center knees of 5-in. by 3-in. by 1/2-in. angles, extend from the end sills to the bumper face, as shown in the diagram. The bumpers are formed of 7-in. channels.

Ash is used in the body framing, and the roof, which is of the plain arch type, is supported on composite carlines. The vestibules are sheathed outside and paneled in-

side with sheet steel, the inside paneling being painted to harmonize with the mahogany trim of the interior. The windows in the vestibules are arranged to drop into pockets.

Vestibule doors on the controller side are of the double, two-leaf type, independently operated, in conjunction with folding steps, by means of a mechanism controlled by the conductor and located inside the car. One of the doors folds inward against the vestibule corner post, and the other



STEEL UNDERFRAME CARS FOR PORTLAND. Plan of steel underframe, showing wooden member into which posts are tenoned

opens outward against the car body. On the brakestaff side of the vestibules are single doors which slide into pockets, and are operated by the motorman by means of a foot mechanism.

As indicated in the foregoing paragraph, the interior of the cars

ranged to raise. As will be noted in the illustrations, the cars are built without bulkheads.

The transverse seats are of the Brill "Winner" type, and, like the longitudinal seats, are upholstered in Brill twill-woven rattan. In addition to the usual push-button



STEEL UNDERFRAME CARS FOR PORTLAND. Omission of bulkhead doors adds considerably to the roomy appearance of the cars

is finished in light mahogany, with a headlining of oak veneer and a cement floor. Arched-head, double sash windows have stationary upper sashes, and lower sashes ar-

signal system, the cars are equipped with an electrical device to notify the motorman when the rear doors are closed. The cars are mounted on Brill No. 51-E1 trucks.

It should not be difficult to make a car with a "seats for everybody" arrangement, and the chances are that a good many passengers would stand for it—if space were allowed.

Third-Class Trail Car for Barcelona

Cataluña Railways Company



THE J. G. Brill Company recently shipped to the Cataluña Railways Company, Barcelona, Spain, a compos-

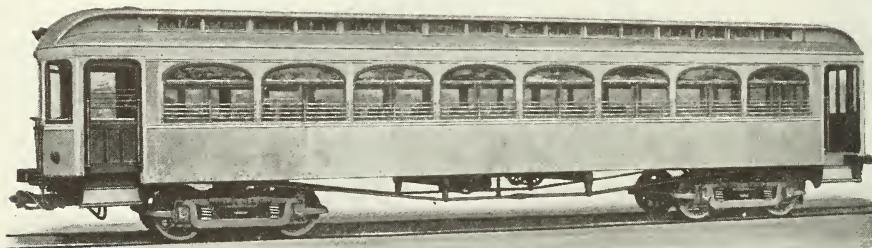
ite underframe, third-class trail car, which is one of a number of cars of various types which this car builder is constructing for the railway company. It will be remembered that a description of some very interesting construction cars, built for this railway, was published in the November, 1913, issue of BRILL MAGAZINE.

The car just completed has 5 $\frac{3}{4}$ -in. by 8 $\frac{3}{4}$ -in. yellow pine side sills, plated on the inner side with 15-in. by $\frac{3}{8}$ -in. steel with an angle reinforcement at the bottom, as shown in the diagram on page 150. Other longitudinal members consist of two center stringers formed of 7-in. I-beams with wood fillers, and two intermediate sills of 5-in.

I-beams, also with wood fillers. These members extend from bumper to bumper and act as platform supports.

The end sills are of oak, 5 in. by 5 $\frac{1}{4}$ in., and are reinforced with 7-in. by 3 $\frac{1}{2}$ -in. by $\frac{1}{2}$ -in. angles. Crossings are of 3 $\frac{1}{2}$ -in. by 5 $\frac{3}{4}$ -in. oak. Lower truss rods are anchored at the bolsters and pass under queen posts dropped from the needle beams which are formed of 6-in. I-beams.

Corner and side posts are of ash, the former being 3 $\frac{5}{8}$ in. and the latter 2 $\frac{1}{4}$ in. and 4 $\frac{1}{2}$ in. thick, the variation in size of the side posts being necessitated by the arrangement of the side windows. The sides of the car are sheathed with sheet steel to the height of the window rail, the sheathing being reinforced at the top with a steel bar and at the bottom with an angle. The roof is of the monitor deck



THIRD-CLASS TRAILERS FOR BARCELONA. Intended for interurban service on heavy grades, the cars are mounted on Brill No. 27-MCB2 Trucks



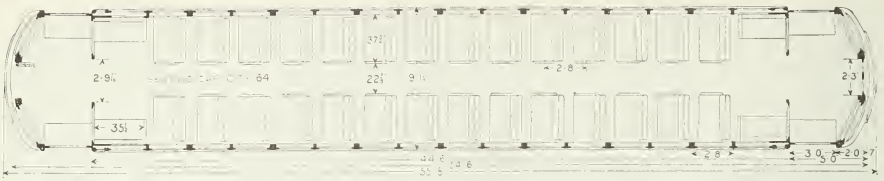
THIRD-CLASS TRAILERS FOR BARCELONA. Train door at each end obviates the necessity for doors in the bulkheads

type, extending over the hoods in steam car style and being provided with half-oval ventilator sashes of opalescent glass, arranged in pairs, and operated in sections of four pairs by means of mechanism located at each end of the car.

Round end vestibules are sheathed outside with sheet steel to the height of the window sills and each is fitted with a two-leaf folding train door in the center, with oval head, drop windows on either side. The vestibule doors are of the single sliding type, operated independently or in conjunction with trap doors over the double steps, by means of a lever mechanism located on the outside of the vestibule.

The pockets into which these doors slide are fitted with hinged inside sashes, protected by bronzed window rods. Platforms are flush with the car floor.

The interior finish is of ash with bronze fittings which include window rods and individual basket racks. The ceiling has a carline finish with the roof boards showing. The floor is double at the sides, with a monolithic filling in the aisle. There are 14 Brill type, transverse, reversible seats and two longitudinal seats on each side of the car, all made of ash slats. The windows are placed 16 on a side and are arranged in pairs. They are of the double sash type, with

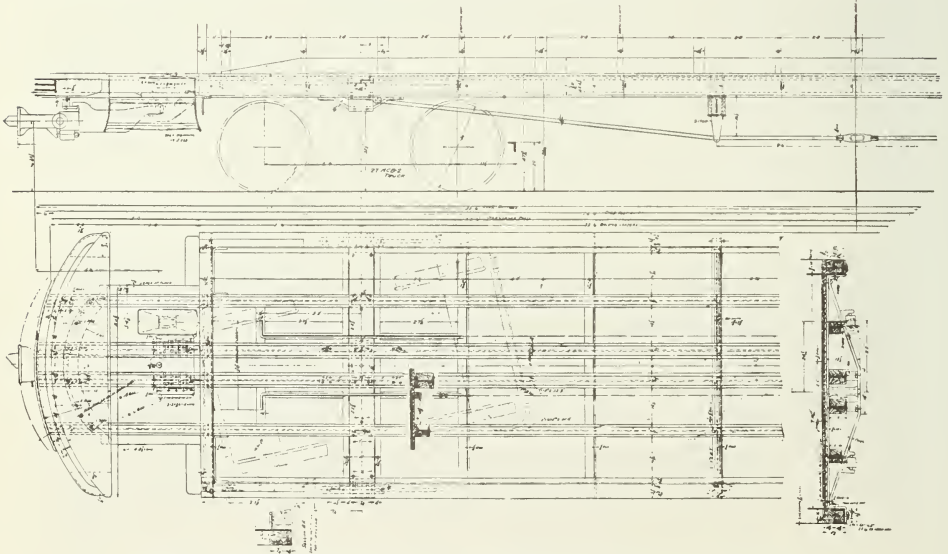


THIRD-CLASS TRAILERS FOR BARCELONA. Track to side sill, 3 ft. 3 ¹/₈ in.; side sill to roof, 9 ft. 8 ¹/₈ in.; floor to carlines, 8 ft. 9 in. Track to step, 26 ¹/₈ in.; two steps to platform, 10 ¹/₂ in. each. Weight of car body, including air-brake equipment, 25,260 lb.

stationary, half-oval upper sashes of opalescent glass, and lower sashes arranged to raise to any desired height up to the level of the lower edge of the upper sash.

The Cataluña Railways Company is at present operating between Barcelona and Sarria in the Province of Cataluña. According to present plans, the completed system will reach Sabadell, west of Barcelona, passing through a number of small towns which will give it a tributary population of from fifty to seventy-five thousand,

and will embrace about twenty-two miles of single and double track and a funicular running from the main line to Mount Vallo, a mountain resort of some prominence. Owing to the extremely hilly character of the country, there are a number of difficult engineering problems to be encountered in the construction of the system, among them being the driving of four tunnels through spurs of the Pyrenees. The longest of these is about a mile and a half. The average grade of the system is 4.1 per cent.



THIRD-CLASS TRAILERS FOR BARCELONA. Diagram showing interesting combination of wood and steel in underframe construction

Combination Cars for Chattanooga

Lookout Mountain Railway Company

THE American Car Company recently built 10 combination cars, containing passenger and package compartments, for the Lookout Mountain Railway Company, Chattanooga,

placed in such a manner as to give the characteristics of a Z-bar. The end sills are formed of 5-in. by 6 $\frac{7}{8}$ -in. oak, and are reinforced with a 6-in. by 1 $\frac{1}{2}$ -in. steel plate. Oak is used also for the crossings, which are secured to the side sill



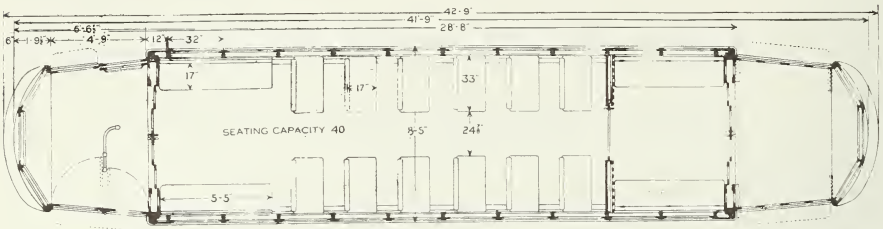
COMBINATION CARS FOR CHATTANOOGA. Cars are mounted on trucks of the Brill No. 27-G type

Tennessee. The railway, together with the Lookout Incline Railway Company, connects Chattanooga, St. Elmo and Lookout Mountain, and operates over about twelve miles of track, including an incline up Lookout Mountain and about four miles on top of the mountain.

The cars have side sills of yellow pine, each sill consisting of two members, with a vertical space between which provides for window pockets. The side sills are reinforced with 15-in. by 1 $\frac{1}{4}$ -in. steel plates, having angle reinforcements at the top and bottom,

plates by means of special steel castings. The bumpers are formed of 7-in. by 3 $\frac{1}{2}$ -in. by 1 $\frac{1}{2}$ -in. angles.

Platforms are supported on outside knees formed of 6-in. by 3 $\frac{1}{2}$ -in. by 3 $\frac{1}{8}$ -in. Z-bars, which are reinforced at the end sills with 5-in. by 5 $\frac{3}{8}$ -in. steel plates. There are no center knees, but the platforms are braced diagonally by means of 3-in. by 3 $\frac{3}{8}$ -in. steel bars in the manner indicated in the diagram of the under-frame on the following page. Inside truss rods, 2 $\frac{1}{2}$ in. by 1 $\frac{1}{2}$ in.,

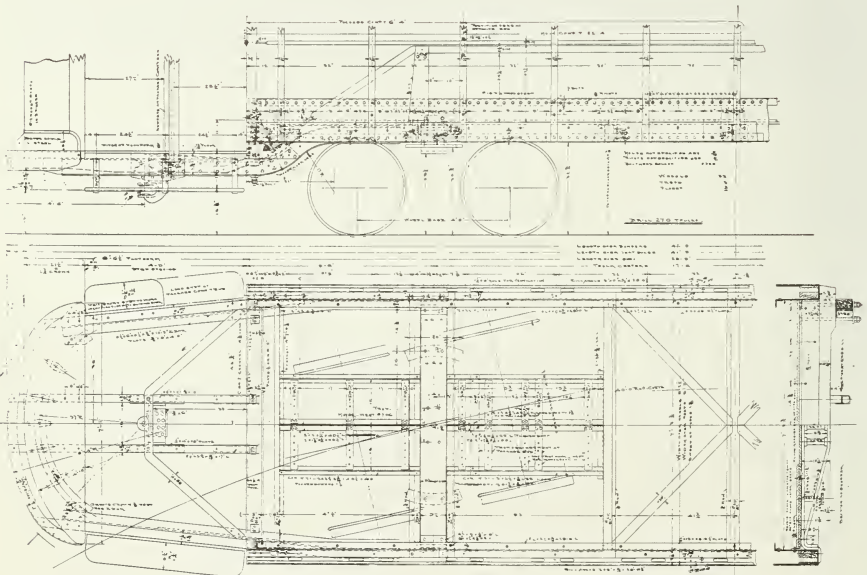


COMBINATION CARS FOR CHATTANOOGA. Track to side sill, 2 ft. 8 $\frac{5}{8}$ in.; side sill to trolley board, 12 ft. 4 $\frac{1}{8}$ in.; floor to headlining, 8 ft. 3 $\frac{3}{8}$ in. Track to step, 16 $\frac{7}{8}$ in.; step to platform, 13 in.; platform to floor, 11 in. Estimated weight of car body, less electrical equipment, 17,000 lb.

extend through the side sills, where they are anchored, and are supported on iron struts over the bolsters.

Corner and side posts are of ash, and the concave and convex side panels are of poplar. Round-end vestibules have three single sash drop windows in front, and are sheathed with sheet steel outside below the window sills. On the controller side, at one end, the ves-

tibule is provided with two swing doors, one hinged to the body corner post and the other to the vestibule corner post. Both doors open inward against the pipe platform railing, forming a division between boarding and alighting passengers, and are operated in conjunction with folding steps by means of a lever mechanism controlled by the conductor. On the opposite side of the vestibule is a



COMBINATION CARS FOR CHATTANOOGA. Diagram of underframe, showing double wooden sill construction

single sliding door. The vestibule on the end of the car containing the package compartment has a double, two-leaf folding door on each side. Bulkhead doors are of the mutually operating, double sliding type, two-leaf folding door on each side, also operated by means of a lever mechanism. Bulkhead doors are

in cherry, with composition headlining. Like those in the vestibules, the side windows are of the single-sash type, arranged to drop into pockets with hinged covers. The transverse seats are of the Brill "Winner" type, and these, as well as the longitudinal seats, are upholstered with Brill canvas-



COMBINATION CARS FOR CHATTANOOGA. There is a single sliding door between passenger and package compartments

of the mutually operating, double sliding type, and are arranged to telescope into bulkhead pockets which are provided with hinged sashes. The partition between the compartments is fitted with a single sliding door. The roof is of the monitor-deck type, fitted with pivoted ventilating sash.

The interior of the car is finished

lined, woven rattan. The transverse seat backs are provided with grab-handles, and cherry hand-poles run the full length of the passenger compartment on either side of the car. Two longitudinal slat seats in the package compartment are covered with Wilton carpet, and are hinged to fold up against the sides of the car.

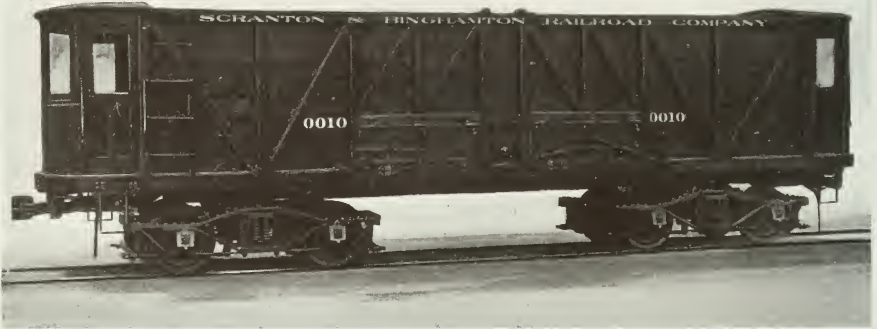
Side and Bottom Dump Hopper Car

Scranton & Binghamton Railroad Company

WITHIN the past month, The J. G. Brill Company completed a very interesting type of coal car for the Scranton & Binghamton Railroad Company. The car has an all-steel underframe, built up of structural

by $\frac{3}{8}$ -in. top cover plate and an 18-in. by $\frac{1}{2}$ -in. bottom cover plate. Bumpers are of the Brill angle-iron type, 6 in. by $3\frac{1}{2}$ in. by $\frac{3}{8}$ in.

The ends, sides and floor of the car are of yellow pine, and the body is lined inside with $\frac{1}{8}$ -in.



HOPPER CAR FOR SCRANTON. Track to side sill, 3 ft. $6\frac{1}{2}$ in.; side sill to trolley board, 7 ft. $9\frac{1}{2}$ in. Weight of car body, less electrical equipment, 24,720 lb.

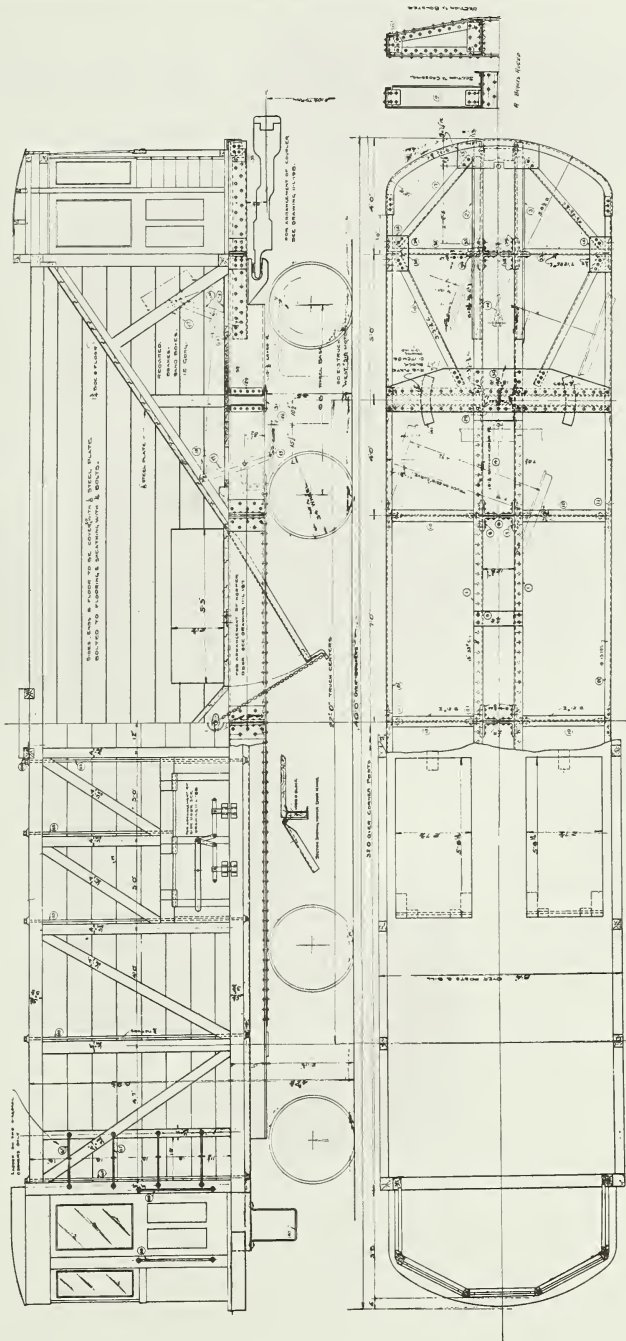
shapes and plates, and is of the bottom and side dump, hopper type. It is mounted on Brill No. 50-E3 trucks.

The longitudinal members of the underframe consist of 8-in. channel steel side sills, and a center box girder formed of 15-in. channels. The crossings are 9-in. I-beams, riveted to the side sills and box girder by means of 6-in. by 6-in. by $\frac{3}{8}$ -in. connection angles. The bolsters are built up of $\frac{1}{4}$ -in. plates, reinforced top and bottom with angles, and having an 18-in.

sheet steel. The brake system is similar to that employed on ore cars, the cylinders being placed above the flooring. The backs of the cabs at each end are left open for convenience in reaching the air-brake and electrical apparatus, which is installed underneath the slope of the hopper floor, as shown in the diagram. The cabs are sheathed outside with sheet steel, and are fitted with three drop windows in front and a door at each side, with standard freight-car steps.

There are two lever-operated trap doors on each side of the car at the center, for dumping purposes. In the bottom of the car are four trap doors of $\frac{1}{4}$ -in. steel plates, which are operated on the twin system by means of a drum shaft and chains.

The car is fitted with United States standard safety appliances, and has couplers placed at M. B. C. height for the purpose of coupling up with standard railroad coal cars. Brill "Dump-pit" sand boxes and "Denden-da" alarm gongs are a part of the equipment.



HOPPER CAR FOR SCRANTON. Diagram showing underframe and side construction, with detail of built-up bolster

New Lightweight Reversible Seat

The Brill "Winner"

THE new Brill "Winner" Seat combines all of the strong points of the former model, with a number of new features which are eminently worthy of a more extended description than could be given in the advertisement which appeared on the inside front cover of the April issue of BRILL MAGAZINE.

Instead of the single wall lever used on the former model, the new "Winner" Seat has double levers at each end. This arrangement, as may be supposed, provides a perfectly equalized action in reversing the seat and gives greater stability, without increase of weight. The action is extremely simple, as the accompanying illustrations indicate, and there are no parts subject to excessive wear, the result being that maintenance costs are reduced

to a negligible minimum. Wall and aisle plates are of pressed steel, in one piece, and the seat cushion is held on rocker castings, supported on angle-iron seat rails.

Back and cushion are framed in ash and, as a rule, are covered with Brill twill-woven rattan, canvas-lined. This, with interlining of felt and canvas, is laid over jute webbing which covers corrugated spring plates, having reinforcing strips to which are attached the spiral back and seat springs. Aside from thickness, practically the only difference in the construction

of back and cushion is that the former being reversible, has the spiral springs set between two corrugated spring plates, while in the latter, the spiral springs rest on ash crossings, as shown in the illustration. The woven rattan covering is rapidly becoming



NEW MODEL BRILL "WINNER" SEAT. Standard seat is handsome in appearance and extremely light in weight



NEW MODEL BRILL "WINNER" SEAT. Showing arrangement of cushion spring system and simplicity of mechanism

standard, especially on city cars, on account of its durability and sanitary qualities, but the "Winner" seat can be furnished with any style of upholstery that may be desired, or with slat seats and backs, or slat seats and spindle backs of any specified wood.

In ordering seats, it is necessary to state whether the side wall of the car is vertical or beveled. If not vertical, a sketch showing the angle of the side wall and any projections is necessary. The distance from side wall to edge of trap door should be stated and also the dis-

tance from side walls over cable boxes or heater pipes. State also how many seats go over the trap door, and give the height from floor to top of cable boxes or heater pipes.

The seat shown here has an overall length of 36 in., with a height of 10 9-16 in. from floor to bottom of wall end casting. The back is 18 in. high, and the entire seat weighs only 63 lbs. Although these dimensions and the weight are standard, "Winner" seats can be supplied in practically any height or style of back.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

It has been said that all business, and particularly that of public utility companies, is a cold-blooded proposition. Many men believe this; others know better.

It has been said that the company has no regard whatever for the man in the ranks; that men with families are laid off and single men employed in their places, and that men are promoted over the heads of others through favoritism.

These are only a few of the things with which men at the head of a street railway, or any large business, have to contend. As a matter of fact, nothing could be farther from the actual state of affairs.

If the man who is laid off would think things over, and be entirely honest with himself, he would realize that the fault was his own. If he had been honest with himself beforehand, he never would have been laid off.

Whether a man is married or single makes no difference to the company. All things being equal, the company would rather employ married men; they are usually steadier. But the fact that a man has family obligations cannot compensate for a lack of ability—cannot excuse an infraction of the rules.

When the company hires a man, it buys ability and service. When it promotes a man, it does so because that man has proved himself worthy of promotion. The man who does his work well is naturally more of a favorite with those above him than is he who works carelessly. But promotion does not go by favoritism.

It is the man who performs his work as it should be performed, who studies means by which it can be done better and thus proves his worth to the company as an investment, who gets ahead. The man who does not do these things remains where he is or else is dropped to make room for a better man. Any right-minded man can rise in this business. It depends entirely upon himself.

Be Cheerful

ONE surly conductor, one motorman with a grouch, can give the whole system a bad name—can put every man in the company's employ in the same class with themselves, as far as the public is concerned. That public is what enables the company to run its cars and pay its men. It must be treated carefully.

Give the Company a Chance

IT is a peculiar thing that some men who would go broke rather than welch on a bet, will nevertheless beat the register or fare box for a few nickels. A few of them have developed a frame of mind where they think there is nothing really wrong in "knocking down" fares. They wouldn't think of cheating a bookmaker who could protect himself, but they do hold up the company which is helpless. Give the company a sporting chance.

The Public

THE street-car traveling public is made up of a lot of very peculiar individuals. Nobody knows that better than the platform men, and nobody knows better than they, how difficult it is to deal with that same public and keep its individual members in a contented frame of mind. It can be done, however, and, as a man can learn how to handle the traveling public, so can he learn how to handle bigger men and things. Sincerity, courtesy and, above all, common sense are the qualities necessary.

Co-operation versus Antagonism

THAT there should be the closest co-operation between all departments of a street railway—or any other large business organization—is admitted. It is too frequently the case, however, that, instead of co-operation, there is antagonism between department heads which communicates itself to all members of their staffs. Each is working hard, no doubt, but his efforts are more for himself and his own advancement than for the general good. Too often his attitude plainly expresses the "let others look out for themselves" idea. There is no real advancement possible by this method. The only permanent benefits are derived from perfect harmony and co-operation. A business is like a machine; it cannot do that which is required of it unless all parts are working in unison.

Steel Car Edition

THE June issue of BRILL MAGAZINE will be devoted to descriptions of all-steel cars, and cars with steel underframes built by The J. G. Brill Company and its subsidiaries. With the steady trend toward steel construction, it is believed this issue will be of great interest to all railway men. The leading article will be descriptive of traffic conditions and cars in Lyons, France.

Brill Advertisements

THE J. G. Brill Company's advertising in the *Electric Railway Journal* for May covers the new No. 76-E Truck, which was described in the April issue of BRILL MAGAZINE. As usual, there will be a change of copy and illustration each week. The advertising in *Electric Traction* will deal with the No. 27-MCB Truck, and that in the *Street Railway Bulletin* with the No. 39-E Truck, into which, as is well known, a new spring system consisting of a combination coil and plate spring has been incorporated.

Mailing Brill Magazine

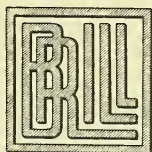
BEGINNING with this issue, an effort is being made to place BRILL MAGAZINE in the hands of all its readers in the United States and Canada on the 15th of the month. In order to accomplish this, it is necessary to start mailing on the 5th, when the copies destined for Arizona, California, Nevada, Oregon and Washington are sent out, and to continue to the 14th, when the copies for nearby distribution go into the mail. The foreign list is mailed on the 5th, and readers in the United Kingdom and France should receive the publication not later than the 15th. If readers will inform the Publicity Department of the date on which this issue was received, they will confer a favor.

Addition to Brill Truck Shop

AN extension has been added to the building occupied by the Truck Department of The J. G. Brill Company, giving the building a total length of 800 feet. A description will be published in a later issue.

Changes of Address

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



The J. G. Brill Company

Main Office
Philadelphia, U. S. A.

Cable Address: "BRILL," Philadelphia

London Office: 110 Cannon Street, E.C.

Cable Address: "AXLES," London

American Car Company, St. Louis, Mo.
G. C. Kuhlman Car Co., Cleveland, Ohio
John Stephenson Co., Elizabeth, N. J.
Wason Manuf'g Co., Springfield, Mass.

Cie. J. G. Brill, 49 Rue des Mathurins, Paris

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PIERSON, ROEDING & Co., 118 New
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Belgium & Holland

C. DUBBELMAN, 24 Place de Lou-
vain, Brussels

Argentine & Uruguay

SHACKLEFORD & Co., Calle San
Martin 201, Buenos Aires

Natal, Transvaal & Orange River Colony

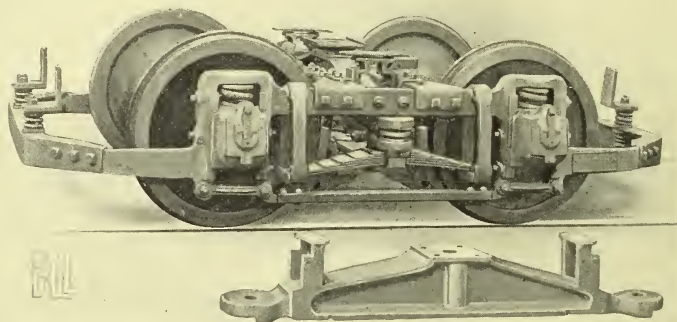
THOMAS BARLOW & SONS, Durban,
Natal

China

SHEWAN, TOMES & Co.
Hong Kong, Canton, Shanghai

Italy

GIOVANNI CHECCHETTI
Piazza Sicilia, 1, Milan



THE BRILL No. 76-E TRUCK

THIS is a new type of Brill Two-Motor Truck, with a body spring system in which a spiral spring is interposed between the bolster and the semi-elliptic spring. By this combination, the spiral spring absorbs the vibrations which are not taken up by the semi-elliptic, and, owing to the large diameter of the spiral spring and the flat bearing of the ends of the semi-elliptic, tends to overcome objectionable side-swaying. The spiral spring rests in a seat casting on the semi-elliptic. The end of the bolster is cast to form a cap for the spiral spring, as shown in the illustration, and between the cap and the seat casting there is about $\frac{3}{8}$ -in. space when the car is without a load. This space closes as the car fills, and thereafter the semi-elliptic only carries the maximum load, an arrangement calculated to practically eliminate all wearing of parts and to make an extremely easy-riding car for all conditions of service.

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA

C625.662085

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Vol. VIII

JUNE, 1914

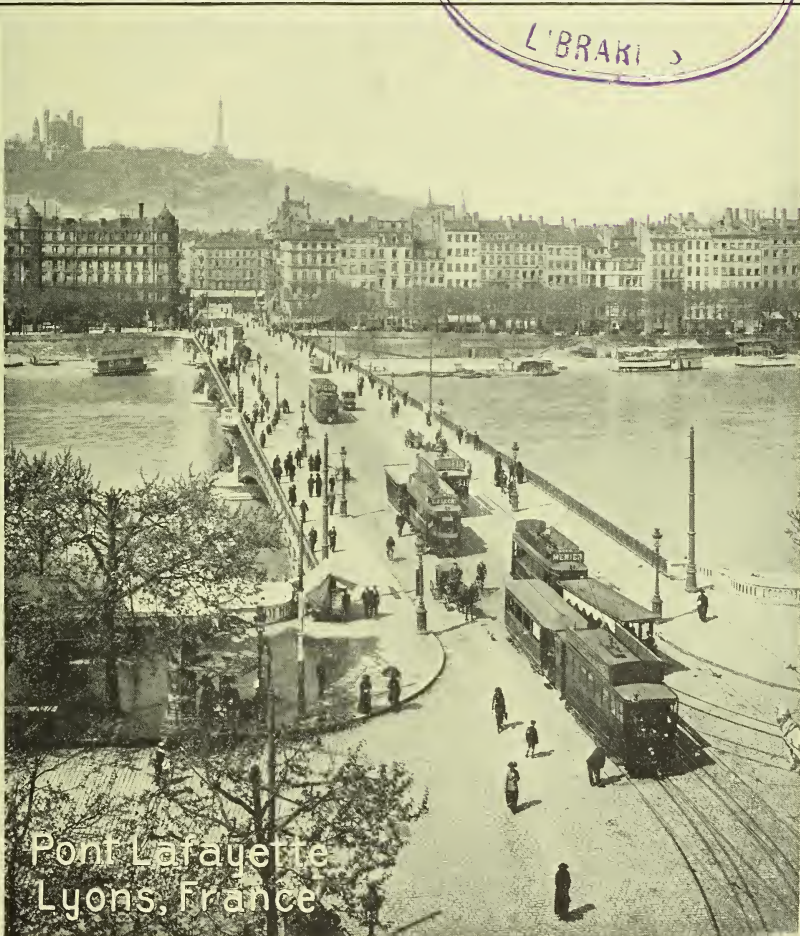
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BRILL MAGAZINE

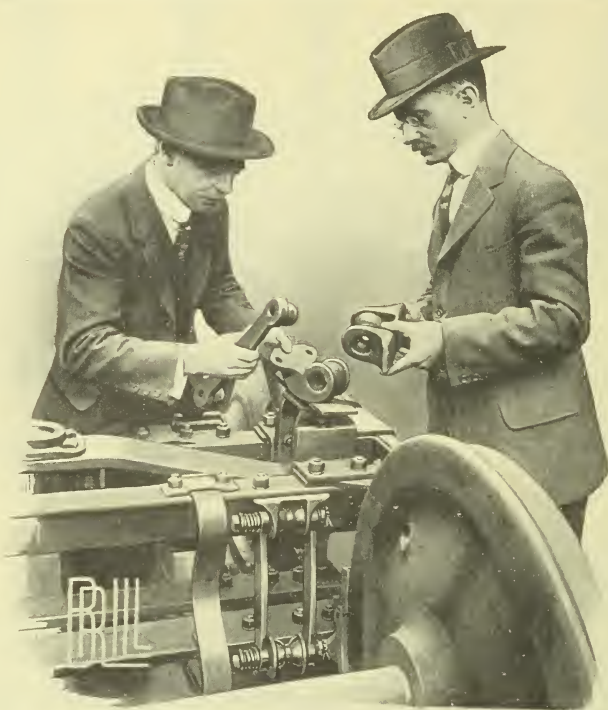
SMITHSONIAN

OCT 20 1915

L'BRARI



Pont Lafayette
Lyons, France



HALF-BALL BRAKE HANGER

EXTREMELY simple in construction, noiseless and thoroughly practical, the Brill Half-Ball Brake Hanger is self-adjusting for wear and for changes in the relative positions of brake shoe and wheel. The half-ball ends of the hanger forgings are milled and the sockets of the malleable castings are reamed, thus insuring a perfect fit of the finished surfaces, which take all of the wear and are self-cleaning. Adaptable to any type of truck. Catalog No. 185.



EDOUARD GUILLON
GENERAL MANAGER, LYONS TRAMWAYS

Broad-Mindedness

The broad-minded man acquires this quality as a result of wide experience and close observation of self and others.

With its acquisition comes a tolerance, within proper limits, of the mistakes of others, but an inability to condone one's own faults.

Also, there is included, as a necessary part of the quality, an utter absence of pettiness.

Broad-mindedness presupposes a capacity for work and thought which is most essential in the handling of men and large affairs.

Volume
Eight

Brill Magazine

Number
Six

June 15, 1914

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Edouard Guillon

EDOUARD GUILLON, General Manager of La Compagnie des Omnibus et Tramways de Lyons, France, was born at Lille, France, in 1872. He received his early education at Nice College and at Charlemagne College, Paris, finishing at the Ixelles Athenaeum, in Belgium. Following this, he took the technical and engineering courses at the School of Mines and Electricity at Mons, Belgium, where he obtained the diploma of electrical engineer. His first position in the railway field was with the Ostend-Littoral Tramways. From there he was sent to Algiers as assistant engineer of La Compagnie des Chemins de Fer sur Routes d'Algérie, which system was at that time in course of being electrified. After his service with that company, he became connected with the Société Electricité et Hydraulique de Charleroi in Belgium, and was sent to Valencia to superintend the electrification of the tramways there. Following this, he was appointed director of La Nouvelle Compagnie Lyonnaise de Tramways, which at that time was exploiting a part of the Lyons system. Mr. Guillon's task was the rehabilitation of this concern, which had been in liquidation three times prior to his connection with it. Under his direction, the company was completely re-established and developed. In 1905 La Nouvelle Compagnie Lyonnaise de Tramways combined with the powerful Compagnie des Omnibus et Tramways de Lyons, and subsequently Mr. Guillon assumed his present office of General Manager of the consolidated systems. He is also on the boards of a company known as Les Exploitations Electriques de Paris, and the electric tramway companies of Montpellier, Nimes, Bordeaux Suburbains, Beziers, Perpignan, Angoulême, Cherbourg, Tours, Lorient, Besançon, St. Etienne and Oran, Algeria. He is a Knight of the Order of the Crown of Belgium.

Conditions Which Govern the Type of Car for City Service

Lyons, France

LYONS, the second city in size and importance in France, is situated at the confluence of the Rhone and Saône Rivers. in a particularly rich part of the country. The city proper has about five hundred and thirty thousand inhabitants, but the suburban districts immediately surrounding, and connected with it by tramways, give a total population of somewhat over six hundred and fifty thousand. The city is very old and, in early years, was the leading town of Roman Gaul.

Much of the commercial importance of Lyons is due to its location at the junction of roads leading from the northern, western and central parts of France to Italy, Switzerland and the Mediterranean, and from the southern part to England, Belgium and Germany. Its commercial and industrial growth has received considerable impetus in recent years, owing to the numerous railroads which converge there and to the abundance of power supplied by several hydro-electric plants. Some of these are located in the near vicinity, while others are in the Alps, in some instances 120 miles from the city.

One of the leading industries is the manufacture of silk, in which the city enjoys a world-wide trade.

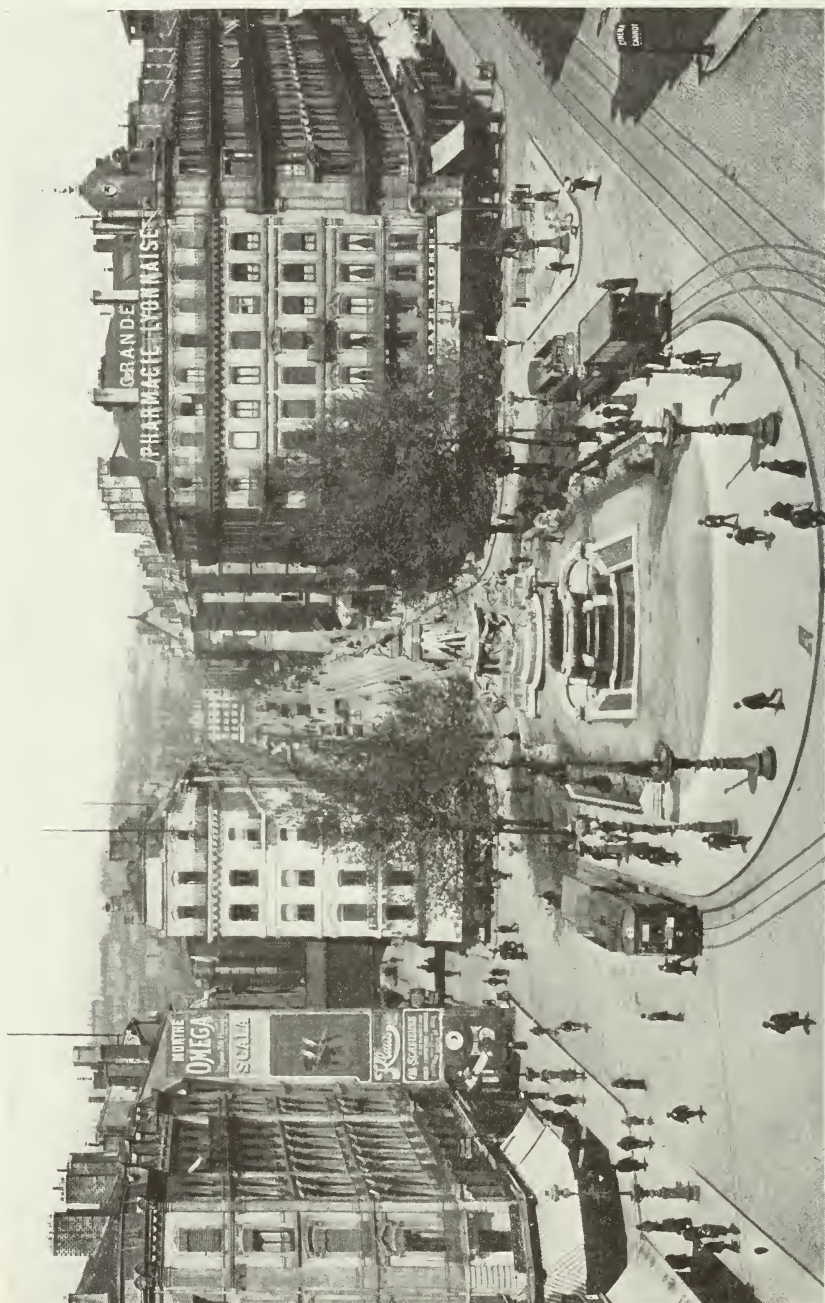
There are numerous bleaching and dye works, chemical manufactories and mechanical industries, chief among the last mentioned being the manufacture of automobiles. There are also large foundries, iron and steel plants and coal mines in the vicinity, and the city is the center of an important fruit country, which embraces the famous vineyards of Burgundy.

The two rivers divide the city and its suburbs into three distinct sections. That in the center is the business section, where the large banks, the Exchange Office, the City Hall and the important retail stores and theaters are located. All of the tramway lines converge in this section. East of this, on the left bank of the Rhone, is the most populous part of the city, and one which is being constantly developed. All of the large manufactories are located here. The western section, on the right bank of of the Saône, is less populous and extremely hilly. It is here that the city was originally built, and the section contains some very old buildings as well as some fine modern residences.

The entire city and suburban tramway system is now operated by the Compagnie des Omnibus et Tramways de Lyon, or the Cie. O. T. L., as it is familiarly known, which absorbed several smaller



LYONS TRAFFIC CONDITIONS AND CARS. The principal section of the city is on the neck of land between the two rivers



LYONS TRAFFIC CONDITIONS AND CARS. Rue de la Republique in center; Rue President Carnot at right. Two of the principal business streets. Note both conduit and overhead systems

companies, which were chiefly concerned in suburban service. The system embraces in all about three hundred and fifty miles of track, of which more than half is standard and the remainder metre gage. About fifty-five miles of new lines are contemplated and will be built in the near future. On completion

city, where the conduit system is used, the lines are equipped for overhead operation on a 550-volt, direct current basis. Two suburban lines are operated on 6,500 volt, 15 cycle, single-phase alternating current, but the cars used on these lines are also arranged for direct current operation on the city



LYONS TRAFFIC CONDITIONS AND CARS. Place Bellecour. Most of the city tramway lines pass this square

of these lines, the company will cover the territory within a radius of 30 miles from the city.

In the central section, most of the lines are double track, and some have three and four rails, in order to accommodate both the standard and the metre gage cars. With the exception of about three-quarters of a mile in the heart of the

lines. Most of the power used on the system is obtained from three hydro-electric plants, two of which are in the Alps, near Moutiers, about one hundred and ten to one hundred and twenty miles from Lyons, while the third, which is used principally as a regulating plant, is located about half way between the city and the rail-



LYONS TRAFFIC CONDITIONS AND CARS. Place de Terreaux, at foot of hills of La Croix Rousse, where most of silk mills are located



LYONS TRAFFIC CONDITIONS AND CARS. Cours du Midi, terminal of several lines. Layout of tracks has recently been redesigned

way's main source of power.

The rolling stock of the company consists at present of 1,127 cars, divided as follows: 387 motor and 330 trail cars for the standard gage lines, 172 motor and 238 trail cars for the metre gage lines, and 14 incline cable cars. These figures include the baggage and express

The company also owns a few steam locomotives which were formerly employed on some of the suburban roads and are still used when occasion requires.

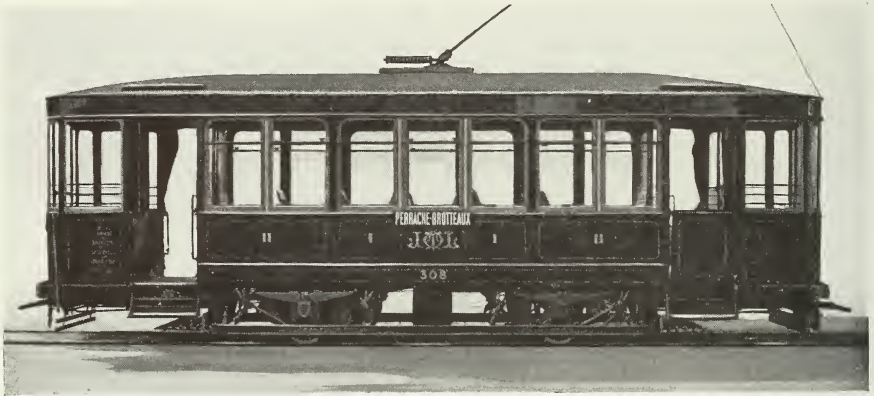
The most recent type of car, which may be considered as standard, is a two-axle, vestibuled car mounted on a running gear. It



LYONS TRAFFIC CONDITIONS AND CARS. Lower station of rack and incline to hills on east bank of Saône

cars used on the suburban lines, various special cars, two double truck electric locomotives, six electric locomotives for a rack line, one special car for cleaning rails and one Brill sprinkler. In addition, about one hundred cars are now in use, or in course of construction, on systems which are in process of being merged with the company.

has a steel underframe, which is borne directly on the journal boxes by means of semi-elliptic springs. The yokes are attached directly to the underframe, and there is little clearance, sideways or endways, between the journal boxes and the side wearing gibs. The wheelbase of the running gear is three metres. The brake rigging is of the eight-



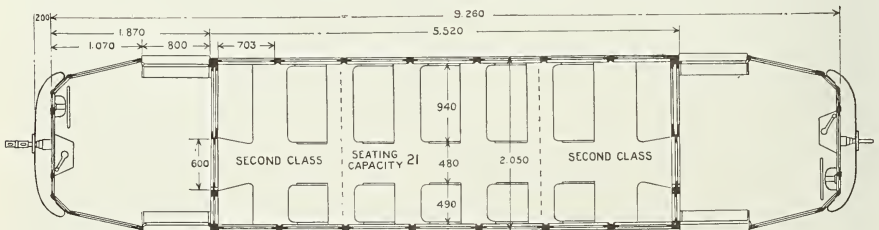
LYONS TRAFFIC CONDITIONS AND CARS. Two-axle cars have steel underframes and are mounted on running gears

shoe type, operated by means of a vertical wheel on each platform. There are no air brakes.

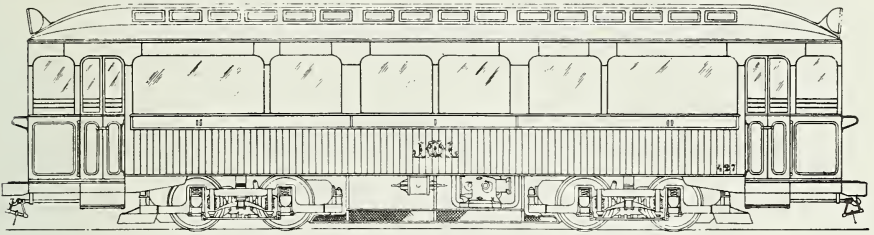
The seats are of the transverse, reversible type, and, as the accompanying floor plan shows, the car is arranged for first and second-class passengers. In addition to the seating capacity shown, there is space on each platform for 13 second-class passengers. Windows are of the double-sash type, the upper sashes being arranged to raise into the roof, while the lower sashes drop into pockets. The former type of car, some of which were built by the Compagnie J. G. Brill, and are still in use, had longitu-

dinal seats and open platforms, but these are now being vestibuled.

The suburban cars are of the double-truck type, mounted on maximum traction trucks, among which are a number of Brill No. 22-A trucks. A new type of double-truck car has recently been designed, and a first lot of 26 of these is now under construction, or in course of delivery. These are intended for operation at 30 miles an hour and are mounted on Brill No. 27-GE1 trucks, built by the Compagnie J. G. Brill, according to European practice, but embodying all of the Brill principles, such as solid forged side frames, etc.



LYONS TRAFFIC CONDITIONS AND CARS. Two-axle : Track to side sill, 695 mm.; side sill to trolley board, 2505 mm.; floor to top of posts, 1935 mm. Track to step, 350 mm.; step to platform, 345 mm.; platform to floor, 200 mm.



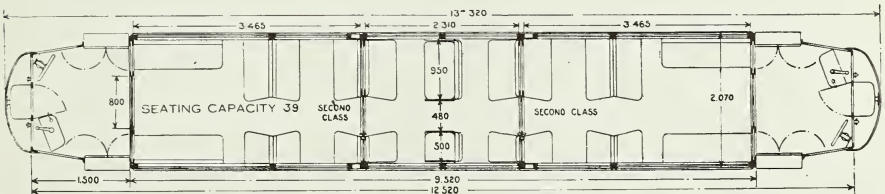
LYONS TRAFFIC CONDITIONS AND CARS. Elevation of the double-track car, mounted on Brill No. 27-G Trucks

The railway company has also designed a special type of car for operation both on the street lines and the rack line. This is a four-wheel type, with a special axle carrying gears to be used for braking when the car is operated on the rack line, where it will be hauled by a special locomotive.

On most of the lines, the cars are operated in trains of two, but in some instances three-car trains are used. On the urban sections, a single fare system is used, each two-cent fare entitling the passenger to one transfer. First-class passengers pay one cent additional. Special laborers' tickets, entitling the holder to four rides a day, are sold for four cents, and, during 1913, eight millions of these tickets were sold. The fares on the suburban lines range from 1.28 to 1.6 cents a mile.

During 1912, the total income of the system was \$2,680,000, with a car mileage of 12,750,000. After the amortization of a number of bonds, and the payment of interest on others, the net profits for the year were sufficient to pay a dividend of \$5.50 on the shares of the company. These shares, which had a nominal value of \$50, are now quoted at about \$140. During 1913, the company's income showed an increase of \$150,000 over the figures for 1912. These results were due partly to the low price of power, and also to the low operating cost on a great part of the system, owing to the absence of steep or long grades, but, to a great extent, a very careful and clever management is also responsible for the fine showing.

During the present year, the traffic will be much greater, owing



LYONS TRAFFIC CONDITIONS AND CARS. Double-track: Track to side sill, 855 mm.; side sill to trolley board, 264 mm.; floor to top of posts, 1,940 mm. Track to step, 390 mm.; step to platform, 390 mm.; platform to floor, 240 mm.

to the number of people who will attend the various congresses which are to be held in Lyons, and the International Urban Exhibition, which has been organized by the municipal authorities, under the patronage of the government.

This exhibition is a very important one and occupies about one hundred acres of floor space. It is especially devoted to the modern city, and all problems bearing on its organization and life, including the subsidiary arts and industries.

In figuring standing space in cars, it is customary to allow one and one-quarter square feet per passenger.

Steel Underframe Cars for Panama Tramways Company

Brill No. 21-E Trucks



A NUMBER of particularly interesting features are included in cars recently completed by The J. G. Brill Company for the Panama

Tramways Company, Isthmus of Panama. These cars have steel underframes, and are mounted on Brill No. 21-E trucks. One thing about them that is out of the ordinary, as far as American practice



STEEL UNDERFRAME CARS FOR PANAMA. Cars are mounted on Brill No. 21-E Trucks and are arranged for left hand operation



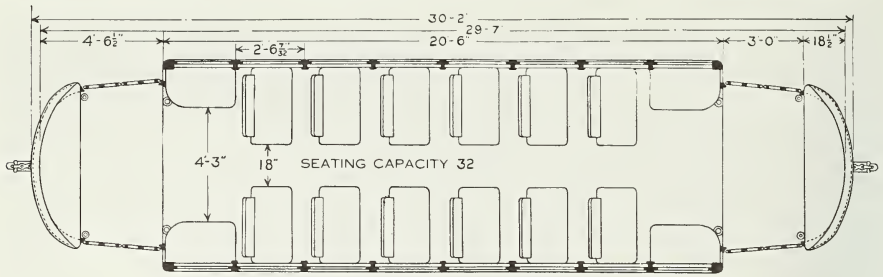
STEEL UNDERFRAME CARS FOR PANAMA. Venetian blinds of mahogany are used instead of the usual curtains

is concerned, is that they are arranged for left-hand operation.

The underframe is made up of structural shapes and plates, as indicated by the diagram on page 172. The side sills are of girder form, consisting of 14-in. by 3-16-in. web plates, reinforced at the top and bottom with angles of suitable size. The lower angles support longitudinal members of wood, into which the side posts are tenoned, and to which the side sheathing is fastened, thus forming window pockets. The end sills are 9-in. channels, and the crossings are 6-in. channels. Wheel-pieces consist of 5-in. I-beams. The underframe is braced diagonally by 3-in. by $\frac{1}{4}$ -in. bars, extend-

ing from the end sills to the crossings immediately in advance of the wheels, and secured by means of plates. Trap-door supports consist of $2\frac{3}{4}$ -in. by $1\frac{3}{4}$ -in. by $\frac{3}{4}$ -in. T-sections. The platform knees are formed of 5-in. channels, suitably reinforced. Bumpers are 6-in. by $3\frac{1}{2}$ -in. by $\frac{3}{8}$ -in. angles.

Ash is used in the body framing, the corner posts being $3\frac{1}{4}$ in., and the side posts $2\frac{1}{4}$ -in. thick. The straight sides of the cars are sheathed with cedar, and this wood is used also for the letter panels. All woodwork of this description is thoroughly impregnated with a preservative in order to guard against the attacks of insects common to tropical countries.

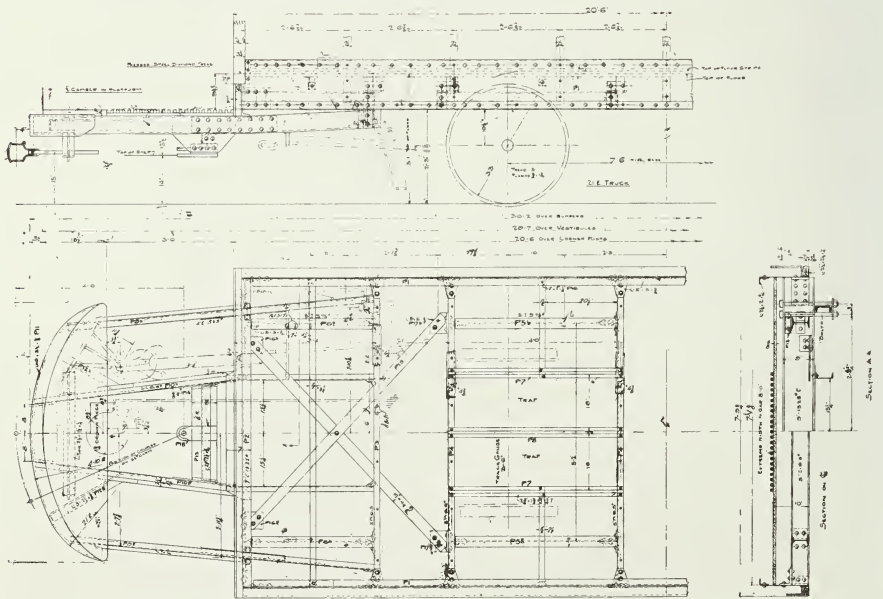


STEEL UNDERFRAME CARS FOR PANAMA. Track to side sill, 2 ft. 3 in.; side sill to trolley board, 8 ft. 10 1/2 in.; floor to headlining, 7 ft. 7 1/2 in.; track to step, 14 in.; step to platform, 13 1/2 in.; platform to floor, 9 1/2 in. Weight of car body, less electrical equipment, 12,375 lb.

The roof is of the plain arch type.

The vestibules are of the round-end type, sheathed with ingot iron, and are provided with three single sash windows arranged to drop into pockets. The platforms are arranged for the pay-within system of fare collection, and are provided with double, two-leaf folding doors on each side. These open outward and are hinged to

the body and vestibule corner posts. The doors on the brake-staff side are operated from the conductor's control stand, while those on the opposite side are operated by means of a mechanism located in front of the motorman. At the corner of each door is a white enamelled pipe stanchion, which serves as a grab handle. Folding steps operate in conjunc-



STEEL UNDERFRAME CARS FOR PANAMA. Diagram of underframe, with detail of construction at end sills

tion with the doors. The platforms are provided with two fare boxes, one attached to the conductor's control stand and the other fastened to a dash panel located between the controller and the vestibule corner post.

Mahogany is used for the interior finish, and the headlining is of

lower section of each blind can be adjusted to various heights. The wall pockets, into which the lower sections of windows and blinds are dropped, are covered with hinged sill sections. Three bronze window rods, hinged to facilitate cleaning, extend across all side windows.

The transverse seats are of the



STEEL UNDERFRAME CARS FOR PANAMA. Central Avenue, one of the main thoroughfares. Narrow streets necessitate single-track operation

composition. There are no bulkheads. The window system is extremely interesting. Double sash, straight top windows are arranged for the upper sashes to raise, while the lower sashes drop into pockets. Instead of the usual curtains, each window is provided with a double Venetian blind of mahogany. These operate on the same principle as the windows, and, like the lower window sash, the

new, double-lever Brill "Winner" type, which was described in the May issue of BRILL MAGAZINE. These, as well as the longitudinal corner seats, are upholstered with woven rattan. The usual push-button system is provided, and the cars are equipped with Brill "Retriever" signal bells and "Dendenda" alarm gongs. Instead of straps, spring handles are provided over the longitudinal seats.

All-Steel Interurban Combination Car for Service in Michigan

Michigan United Traction Company

A MOST interesting type of car was recently completed by The J. G. Brill Company for the Michigan United Traction Company. It is built entirely of steel, even to the roof, is divided into five compartments, and is arranged for operation either by pantograph trolley or third rail. The Michigan United, on which the car will be used, embraces 256 miles of trolley and third-rail system, in and between several important cities of Michigan. The city systems operated by the company are those of Lansing, Kalamazoo, Battle Creek and Jackson, while the interurbans connect Lansing and St. Johns, Jackson and Battle Creek, Jackson and Lansing, Kalamazoo and Battle Creek and Lansing and Owosso.

The lines reach Pine Lake and Waverly Park in Lansing, Oakwood Park in Kalamazoo, Goguac Park in Battle Creek and Wolf Lake and Vandercook Park in Jackson.

The new car is intended for interurban service, and is arranged to be run alone or as part of a train. For a car of its size and type, the underframe construction is extremely simple. Side sills consist of girders formed of 22-in. by $\frac{3}{8}$ -in. steel plates, with $3\frac{1}{2}$ -in. by 3-in. by $\frac{1}{2}$ -in. angles as top and

bottom members. There are four longitudinal stringers of 7-in. channel steel, placed with the webs in a vertical position and supported on crossings formed of 6-in. channels, to which they are connected by means of 5-16-in. stiffener plates in the manner shown in the diagram



ALL-STEEL CAR FOR MICHIGAN UNITED. Car is arranged for both pantograph trolley and third-rail operation



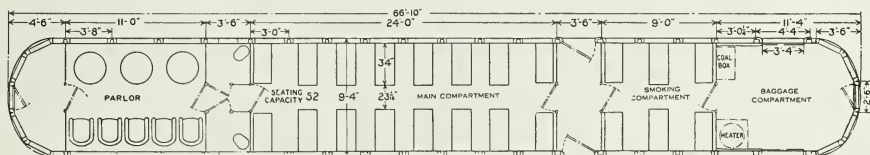
ALL-STEEL CAR FOR MICHIGAN UNITED. Low belt rail permits extra long windows in parlor compartment at front end

on page 176. An especially interesting feature, and one which is out of the ordinary, is that the car is carried on four bolsters. These are built up of 5-16-in. web plates, with $3\frac{1}{2}$ -in. by $2\frac{1}{2}$ -in. by $\frac{3}{8}$ -in. reinforcing angles at the top and bottom. Each pair of bolsters is connected by two 10-in. I-beam sections, and the center plate is carried on two 10-in. channel sections. The longitudinal channel stringers are broken at the bolsters, into which they are framed by means of connection angles, as indicated on the underframe diagram.

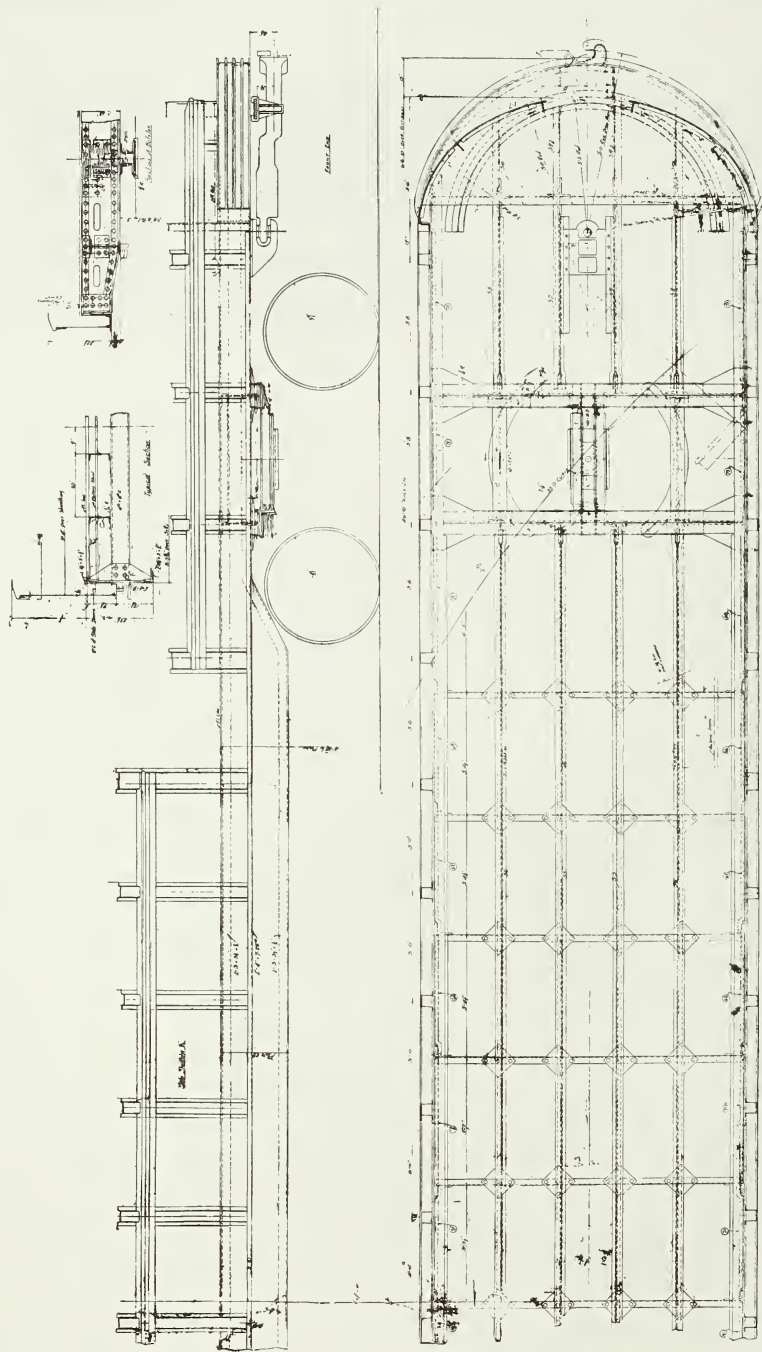
No wood is used in any part of the body construction. The corner and side posts are formed of pressed steel shapes, and the sides consist of girders formed of 3-32-in. web plates, which are reinforced at the bottom with 4-in. channels, and at the top with rectangular

bars and the pressed-steel belt rails. This construction is shown in detail in the diagram of the underframe and side construction. The roof, which is of the plain arch type, is covered with sheet steel, and is provided with 16 Brill "Exhaust" Ventilators. Round-end vestibules are sheathed with steel and have a single, hinged train door in the center. Each has four double-sash windows, with stationary upper sashes and lower sashes arranged to raise.

As indicated on the accompanying floor plan, and, as stated above, the interior is divided into five compartments. At the front end is the motorman's cab to which, it will be noted, there is no entrance other than that afforded by the train door in the center. The cab is separated from a parlor compartment by a bulkhead in which are two long, single-sash windows

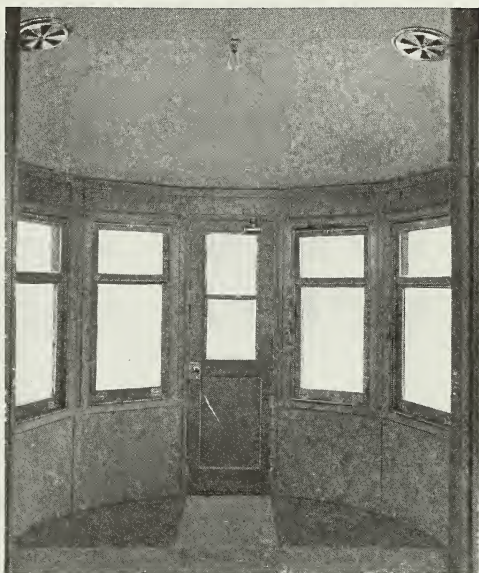


ALL-STEEL CAR FOR MICHIGAN UNITED. Track to side sill, 3 ft. $7\frac{3}{4}$ in.; side sill to pantograph base, 10 ft. $1\frac{1}{2}$ in.; floor to headlining, 8 ft. $11\frac{1}{2}$ in. Weight of car body, less electrical equipment, 60,000 lb.



ALL-STEEL CAR FOR MICHIGAN UNITED. Diagram of steel underframe, showing interesting detail of built-up bolster

and a single, hinged door. To the rear of the parlor compartment, two partitions, each fitted with a single hinged door, form a passageway, on either side of which is a toilet room. Next comes the main passenger compartment, and next to that, the smoking compartment. Between these are two partitions with single hinged doors at the center, which form a corridor or vestibule, on either side of which are located the main entrance doors of the car. These doors are of the single hinged type, and each operates in conjunction with two steps, which slide underneath the car when the doors are closed. The rear end of



ALL-STEEL CAR FOR MICHIGAN UNITED. Baggage compartment contains heater and coal box, not shown in illustration

the car, which is separated from the smoking compartment by a partition, is taken up by the baggage compartment. This has a single sliding door on either side, and contains the hot-air heating apparatus and the coal box.

The interior is steel, with composition ceiling, wainscot and floor. The floor in the parlor compartment is carpeted. All hardware and trimmings are of bronze, as are also the basket racks in the three passenger compartments. All of the side windows are double, both upper sashes being stationary, while both lower sashes are arranged to raise. Additional length is given the windows in the parlor compartment by



ALL-STEEL CAR FOR MICHIGAN UNITED. Main compartment, showing corridor door leading to smoking compartment



ALL-STEEL CAR FOR MICHIGAN UNITED. Parlor compartment is arranged for three revolving chairs and five portable arm chairs

depressing the belt rail at this point. Each passenger compartment is equipped with an electric fan. Electro-pneumatic whistles at each end are operated by means of a cord running the entire length of the car.

Although the seats were not in

place at the time the photographs which accompany this description were taken, the seating arrangement is quite interesting. On one side of the parlor compartment are three stationary-base, revolving chairs, upholstered with green friezette, and on the other side are

five portable, mahogany parlor car chairs, upholstered with black leather. The main passenger compartment is equipped with eight transverse, reversible seats on each side. These are upholstered

with material similar to that used on the revolving chairs in the parlor compartment. The smoking compartment has six transverse, reversible seats, three on a side, upholstered with black leather.

The most important development in trucks during recent years is the bolster coil spring for the single-motor truck.

Single-Truck Prepayment Cars for Austin, Texas

Austin Street Railway Company

RECENTLY the American Car Company completed an order of cars of a very interesting type for the Austin Street Railway Company, Austin, Texas. The cars are built of

steel to the window sills, and are arranged for double-end operation on the prepayment system of fare collection. They are mounted on Brill Radiax E1 trucks.

As the diagram on page 181 indicates, the underframe construc-



SINGLE-TRUCK CARS FOR AUSTIN. Congress Avenue at Sixth Street, one of Austin's busiest traffic points

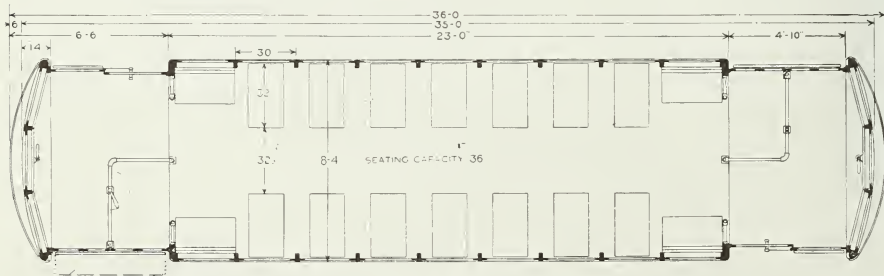


SINGLE-TRACK CARS FOR AUSTIN. The Brill Radiax El Truck on which this car is mounted has a wheelbase of 11 ft.

tion is extremely interesting and well calculated to withstand any normal strain, without making an unduly heavy car. As a matter of fact, an effort was made to keep the weight down to the lowest point consistent with safety, and the total weight of approximately 11,000 pounds, less electrical equipment, is sufficiently light for a car of this type.

Structural shapes and plates were used entirely in building the underframe. The side girders are formed of 28-in. by 5-32-in. web sheets, reinforced at the top by 2-in. by 11½-in. by ¼-in. angles, and

at the bottom by 5-in. by 3½-in. by ⅜-in. angles. The web sheets are stiffened at each side post by means of 1½-in. by 1½-in. by 3-16-in. angles, which serve also as post supports. End sills are 8-in. channels, and crossings consist of 4-in. channels. The wheel-pieces are formed of 4-in. by 3-in. by 5-16-in. angles. The frame is braced diagonally by means of 2½-in. by ¾-in. bars, extending from the side sill angles to the center of each end sill, where they are anchored to 4-in. by 3-in. by ⅜-in. angles. Trap-door supports are formed of T-sections of suitable size. The



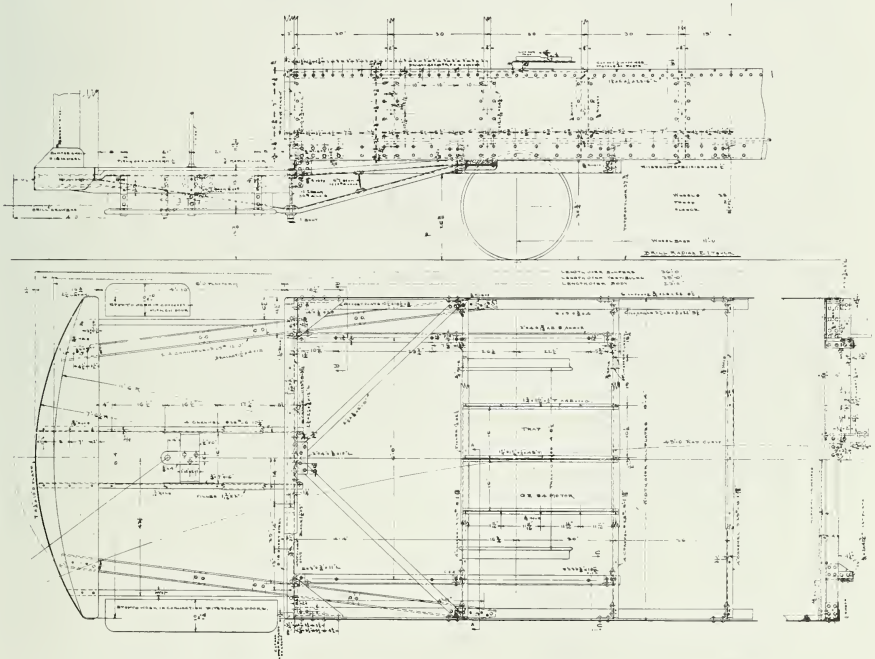
SINGLE-TRACK CARS FOR AUSTIN. Track to side sill, 2 ft. 6¾ in.; side sill to trolley board, 9 ft. 2 in.; floor to headlining, 7 ft. 8¾ in. Track to step, 15¾ in.; step to platform, 13 in.; platform to floor, 8½ in. Estimated weight of car body, less electrical equipment, 11,000 lb.

platforms are supported on center and outside knees formed of 4-in. channels, the latter being of truss type, as the diagram indicates.

The body framing is of oak, with corner posts 3 in., and side posts 2 in. in thickness. The plain arch roof is fitted with six Brill "Exhaust" Ventilators and with roof gongs. Windows are of the dou-

tionary, while the lower ones are arranged to drop into pockets.

There are no doors nor bulkheads in the car, three iron pipe stanchions, extending from floor to ceiling, being placed at each end. On the controller side of each vestibule is a double, two-leaf folding door, opening outward, one section being hinged to the body corner post, and



SINGLE-TRACK CARS FOR AUSTIN. Diagram of steel underframe, showing interesting method of platform support

ble sash type, with the stationary upper sashes framed in one continuous piece from end to end. The lower sashes are arranged to raise to the height of the lower edge of upper sashes. Vestibules are sheathed inside and outside with sheet steel, and are provided with three double sash windows, in which the upper sashes are sta-

tionary, while the lower ones are arranged to drop into pockets. These are operated in conjunction with folding steps, by means of a mechanism controlled from the conductor's position. An iron pipe stanchion is placed in the center of each opening to separate incoming and outgoing passengers. On the brakestaff side, each vestibule is provided with a single door,



SINGLE-TRACK CARS FOR AUSTIN. Side posts are provided with push-buttons and brackets for "Jim Crow" signs

which slides outside the vestibule side panel, and is operated by the motorman.

The interior of the car is finished in cherry, but there is no lining below the window sills, the side plates being painted to harmonize with the woodwork above. The headlining is composition. There are seven transverse reversible, and two longitudinal slat seats on each side, the former being of the Brill "Winner" type. Brill signal bells, drawbars and "Dumpit" Sand Boxes are used.

Austin, the capital of Texas, is situated on the Colorado River and, with its suburbs, covers an area of about thirty square miles, with a population of 43,670. The city

boasts the largest capitol building of any State in the country.

The University of Texas, with an attendance of about three thousand five hundred, occupies a central position in the city. Although numerous manufacturing plants are located at Austin, the surrounding country is distinctly agricultural, the principal crops being cotton, grain, alfalfa, sugar cane, fruits and vegetables. The city is the distributing point for a radius of 100 miles, and is an important live stock center. The Austin Street Railway Company operates over about twenty-two miles of track, and reaches Woolridge Park, where is one of the largest amphitheatres in the South.

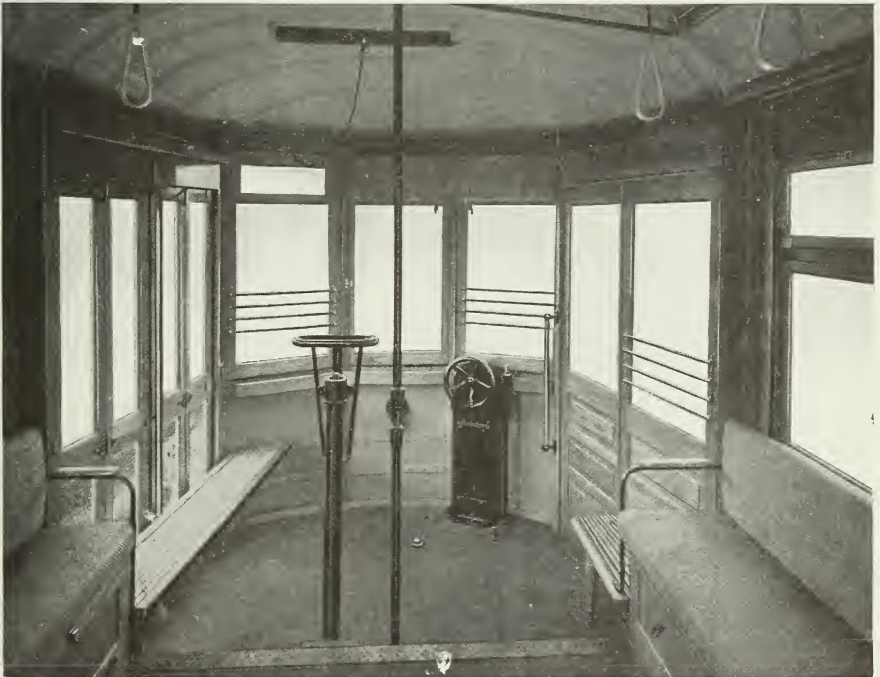
Single-Truck Convertible Car for New York City

Third Avenue Railway Company

THE J. G. Brill Company recently completed a car that is considerably out of the ordinary in a number of features, for the Union Railway system of the Third Avenue Railway Company, New York City. The car is of the full convertible type, but particular interest attaches to the fact that it is stepless and is mounted on a single truck, the

Brill Radiax E1 truck, with a wheelbase of 10 ft., being the type used. The bottom and body framing is composed entirely of steel shapes and plates. Since its delivery, the railway company has placed an order for a number of similar cars with the same car builder. These cars are now in course of construction, and will be described in a later issue of BRILL MAGAZINE.

As may be gathered from the



SINGLE-TRUCK CONVERTIBLE CAR FOR NEW YORK. Long slat seat on platform folds up against body corner post

diagram on page 186, the under-frame construction is simple and well calculated to meet the demands of the service. Side sills are of the girder type, being formed of 14-in. by 3-16-in. plates, with rectangular bars for the top members, and 3-in. by 2-in. by $\frac{1}{4}$ -in. angles for bottom members.

on a plate and angle construction as shown in the diagram.

The corner posts are formed of angles, and the side posts, which are T-irons, are continuous from side sill to side sill, and are bent to shape to serve as supports for the plain arch roof. This is of composition, covered with canvas.



SINGLE-TRUCK CONVERTIBLE CAR FOR NEW YORK. Electric lamp sockets are set in center of ventilating grilles

The wheelpieces are 5-in. by $3\frac{1}{2}$ -in. by $\frac{3}{8}$ -in. angles. End sills consist of 10-in. channels, and the crossings are 3-in. I-beams. Trap-door supports are $2\frac{3}{4}$ -in. by $1\frac{3}{4}$ -in. by 5-16-in. T-sections. The bumpers are formed of 4-in. by 4-in. by $\frac{1}{4}$ -in. and 3-in. by 3-in. by $\frac{1}{4}$ -in. angles, placed back to back, and the platforms are supported

Extending along the center of the roof is a ventilating duct, $9\frac{1}{4}$ in. wide and 4 in. high. This has sides of sheet steel, and wooden top. It is fitted with two ventilators on each side, and is connected with the interior of the car by means of nine square grilles, placed along the center of the roof. Body sheathing and letter boards are of steel.



SINGLE-TRUCK CONVERTIBLE CAR FOR NEW YORK. Low-hung platforms obviate the necessity for platform steps

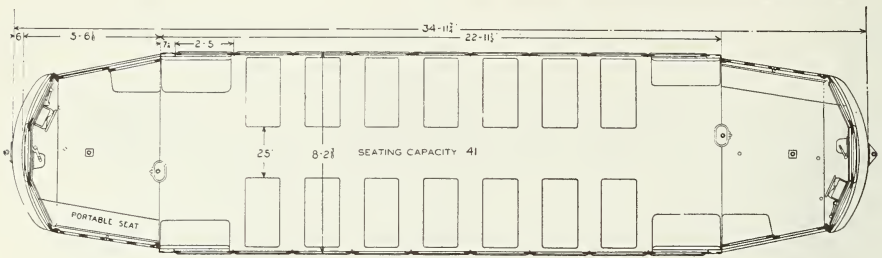
Vestibules are of the round-end type, and are provided with three single-sash windows, those in the center being hinged to swing outward, while those at the sides are stationary. On the brakestaff side of each platform is a single door, arranged to slide outside the stationary vestibule panel, and operated by the motorman by means of a lever mechanism swung down from the hood of the vestibule. These doors are paneled in the lower part and glazed above. On

the opposite side of each platform are two-leaf folding doors in two sections. These are paneled below with wire glass and above with clear glass, and are hinged, respectively, to the body and vestibule corner posts. They are controlled from the conductor's stand.

The interior of the car is finished in ash. There is no headlining, the composition roof and T-supports being exposed. Body end doors are dispensed with, there being only a pipe stanchion and the con-



SINGLE-TRUCK CONVERTIBLE CAR FOR NEW YORK. In warm weather the side panels are replaced by wire mesh screens

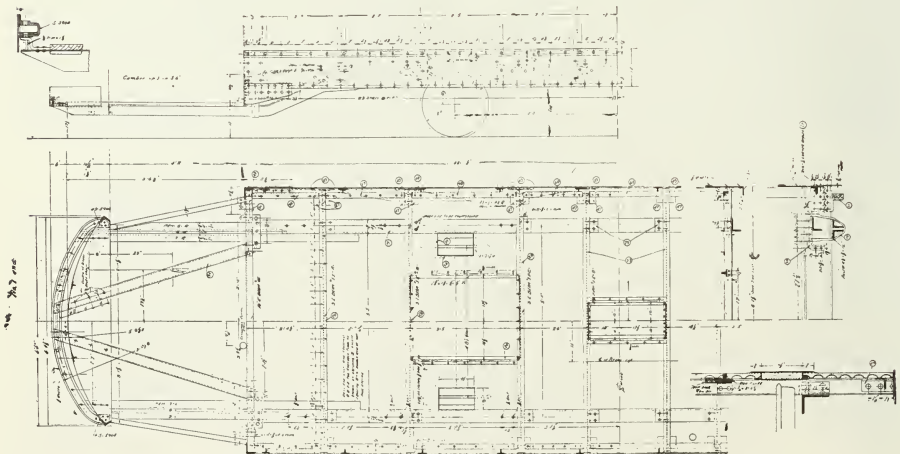


SINGLE-TRUCK CONVERTIBLE CAR FOR NEW YORK. Track to side sill, 1 ft. 6 in.; side sill to trolley board, 9 ft. 0 3/8 in.; floor to roof, 7 ft. 9 in. Track to platform, 13 in.; platform to floor, 10 1/2 in. Weight of car body, less electrical equipment, 12,840 lb.

ductor's stand at each end of the car body. The sides are paneled between the posts and, except the end sections, are removable in warm weather, as indicated in one of the illustrations on page 185. High wire mesh screens are attached to the posts by means of clips when the sides are removed. Windows are of the double-sash type, the top sashes being arranged to raise, while the lower sashes are removable.

On each side of the car are seven Brill "Winner" seats, and a lon-

gitudinal seat at each end. These are all upholstered with woven rat-tan. The platforms are provided with a long slat bench on the controller side, designed to fold up against the end panel of the inside longitudinal seat, when the folding vestibule doors are in use. On the brakestaff side of each platform is a stationary slat seat, placed against the vestibule panel. Hand straps are hung over the inside longitudinal seats, and the backs of the transverse seats are provided with grab handles.



SINGLE-TRUCK CONVERTIBLE CAR FOR NEW YORK. Diagram of underframe, showing detail of various sections

Passenger and Baggage Cars for New York State Service

Geneva, Seneca Falls & Auburn Railroad

AN order recently completed by the Wason Manufacturing Company for the Geneva, Seneca Falls & Auburn Railroad Company, Inc., Seneca Falls, New York, involved combination passenger and bag-

formed of 36-in. by $\frac{1}{8}$ -in. plates, with $2\frac{1}{2}$ -in. bars for top members, and 5-in. by $3\frac{1}{2}$ -in. by 5-16-in. angles for bottom members. The center stringer is a 10-in. channel, placed with the flanges down, and boarded over to form a box for the cables. End sills are 10-in.

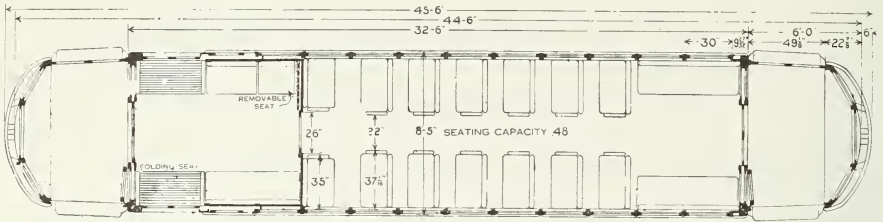


COMBINATION CARS FOR SENECA FALLS. Cars are equipped with Brill "Exhaust" Ventilators. Photographed on temporary trucks

gage cars of a type well calculated to meet the demands of service on the railway company's lines. These comprise about seventeen miles of track, connecting Geneva, Seneca Falls, Waterloo and Cayuga Lake Park in the northern central part of New York State. The park, as its name indicates, is on the shores of Cayuga Lake, and is quite a pretentious resort. It is owned and operated by the company.

The new cars have steel underframes, as the accompanying diagram shows. The side girders are

channels, placed with the flanges out. The crossings are 4-in. channels, fastened to the side sill angles with suitable gusset plates. Needlebeams are formed of 5-in. I-beams. The cars are braced diagonally by means of 3-in. by $\frac{3}{8}$ -in. bars, extending from the center crossing to the side sill angles to which they are gusseted. The platforms are supported on outside knees of 7-in. by $3\frac{1}{2}$ -in. by $\frac{1}{2}$ -in. angles, extending from the bolsters to the bumpers, and on center knees of 5-in. by $3\frac{1}{2}$ -in. by $\frac{1}{2}$ -in. angles, extending from the



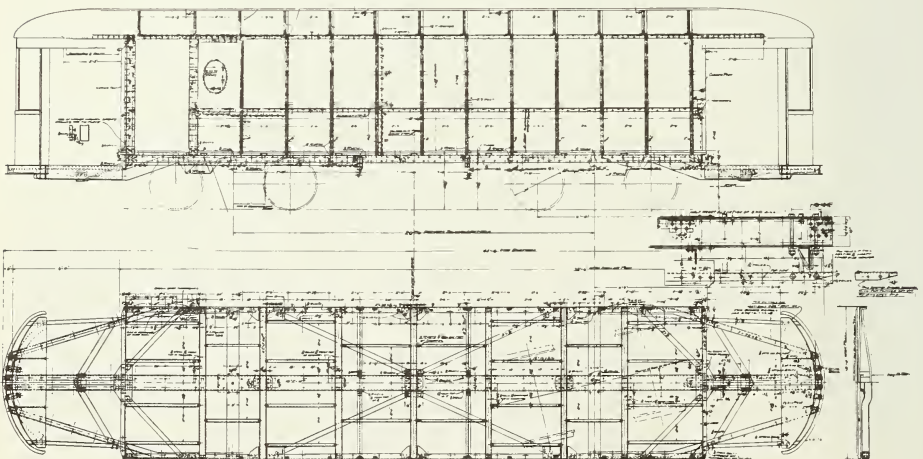
COMBINATION CARS FOR SENECA FALLS. Track to side sill, 2 ft. 7 1/8 in.; side sill to trolley board, 8 ft. 9 1/2 in.; floor to headlining, 7 ft. 8 3/8 in. Track to step, 15 in.; step to platform, 14 in.; platform to floor, 10 in. Weight of car body, including electrical equipment, 22,400 lb.

end sills to the bumpers. The platforms are further braced by 3-in. by 3/8-in. bars, which also afford anchorage for the drawbars. The bumpers are formed of 6-in. channels, placed with the flanges out. Floor supports consist of 1 1/2-in. by 1 1/2-in. by 3-16-in. angles.

Steel is used for the body construction, the corner posts being formed of 6-in. channels, and the side posts of 2-in. by 2-in. by 1/4-in. T-iron, riveted to the side plates and secured to the side sill angles by suitable brackets. These posts are covered with wood. The plain

arch roof is supported on 1 1/2-in. by 1 1/2-in. by 1/4-in. T-iron rafters, one at each side post. These are covered with sheet steel and canvas, with suitable lining between. The top plates are 3-in. by 2 1/2-in. by 1/4-in. angles, and the letter-board is sheet steel.

Vestibules are provided with three drop windows, those in the centers being adjustable. On each side are two-leaf doors, folding against the end of the car body. The body end doors are of the mutually operating double sliding type. There is a single sliding door



COMBINATION CARS FOR SENECA FALLS. Diagram of the underframe and side construction, showing channel and T-iron posts

in the partition between the passenger and baggage compartments, and each side of the baggage compartment is provided with a single sliding door.

All of the side windows are of the straight head, double sash type, with stationary upper sashes

the ceiling has a carline finish.

All seats in the passenger compartment are rattan upholstered. The two placed against the partition between compartments are stationary, while the other transverse seats are reversible. At the bulkhead end are two longitudinal



COMBINATION CARS FOR SENECA FALLS. Handstraps are provided in baggage compartment and over longitudinal seats in passenger compartment

and lower sashes arranged to raise. The baggage compartment also has a single oval window on each side next to the side doors.

The passenger compartment is finished inside with mahogany, with composition headlining and panels between posts, while the inside finish of the baggage compartment is ash-stained mahogany, and

seats. On each side of the baggage compartment is a rattan upholstered longitudinal seat, extending from the partition to the side doors. Folding slat seats are hinged to the bulkhead at this end and dropped across the side doors. One section of seat in this compartment is removable to accommodate a hot-air heater.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

There has always been and will always be a demand for men who are leaders.

In an emergency, a man is always found who can fill the need, but the general demand for leaders can never be wholly satisfied.

One reason is that as more men gain the ability to lead, the standard is raised to an extent that demands leadership timber in the lower positions.

It is well that this is so, because it provides an incentive to further striving for place, which would not exist were the demand for men limited.

Providing a man is not too heavily handicapped by bad health or habits, his ability to rise is limited only by his own inclination and efforts.

It makes no difference where he starts; it is the finish that counts, and the man with the greatest staying powers wins in the long run.

The attainment of lasting success, however, is no short-distance event—no hundred-yard dash, so to speak, where a man expends all of his energy in a few seconds.

It is more nearly comparable to the marathon, in which wind, strength and staying qualities must be husbanded to the last degree for the finish.

In other words, the normal man who sets an objective point for himself, and then works steadily toward that point, will arrive with a calm, well-balanced mind, and with sufficient strength in reserve to carry him through the remainder of his career.

The Night Before

THE company has no right to dictate what its men shall do during their off hours, but it has every right to insist that nothing be done which will in any way interfere with a man's ability to do his full share of the work the next day.

Speeding Up

IF some men would devote as much time to training for their work as they do to getting in shape for an athletic event, they would be much better off. Practice speeding up your work.

Advertising Amusement Parks

AN electrical projecting device is used to good advantage in advertising an amusement park. When a car destined for the park stops at the corner where the device is located, a beam from the lamp flashes the inscription: "This car goes to —— Park. Join the crowd," on the asphalt pavement or on the wall of a building opposite.

The Night Crowd

WE are now in the season of late crowds, when people use the cars for the purpose of getting to and from parks and other amusement resorts, and for taking long rides. At such times of relaxation, the public is apt to be noisy and more or less difficult to handle. Platform men should use extra care to avoid accidents and to check any approach to conduct which will interfere with the comfort of passengers.

Personal Appearance

CLOTHES may not make the man, but they have a great deal to do with a man's making of himself. Put the confirmed slouch into a neatly pressed suit and he will do better work and respect himself for as long a time as the neatness lasts. No man can afford to neglect his personal appearance. Any man can learn to press his own uniform. It should be done at least twice a month. Then, if the coat is kept on a hanger, and the trousers neatly folded when not in use, the suit will last much longer. All clothing should be thoroughly aired before being hung in the closet. Everybody perspires more or less, and perspiration rots the seams and lining of clothing, besides imparting a disagreeable odor. Clean linen, polished shoes, well-cared-for clothing and a clean shave require some slight effort, but cost very little.

To Foreign Readers

FOR the benefit of those foreign readers of BRILL MAGAZINE, to whom the matter published on the two preceding pages, and on the back of the portrait insert makes no special appeal, it may be stated that material of this sort is in considerable demand by railway men in this country. It is used in magazines and on placards, etc., which are put out for the benefit of employees. BRILL MAGAZINE is the only publication furnishing this material in a vein directly interesting to railway men. Any of this material may be used by managers without credit to BRILL MAGAZINE.

A Simultaneous Distribution

AS stated in the preceding issue of BRILL MAGAZINE, an attempt was made last month to secure a simultaneous distribution of the publication in the United States, Canada, Great Britain and France on the 15th of the month. According to the reports which have been received to date, the new system of mailing was generally successful.

The Brill Advertising

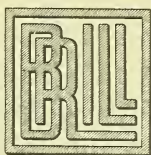
DURING the month of June, The J. G. Brill Company's advertising in the *Electric Railway Journal* will deal with baggage and service cars. These are types which are coming more and more into use and in which railway men, generally, are much interested. The system of providing a complete change of copy and illustration each week is continued. In *Electric Traction*, the advertising will cover the new Brill "Winner" Seat, a complete description of which appeared in the preceding issue of BRILL MAGAZINE. The advertising in the *Street Railway Bulletin* will cover the Brill "Radiax" Truck.

Steel Cars

IN view of the steady growth of interest in all steel and steel under-frame cars, it is believed that this issue of BRILL MAGAZINE will make a special appeal to railway men. It will be noted that, while all of the cars described are of this class of construction, they represent widely differing types.

Changes of Address

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



The J. G. Brill Company

Main Office
Philadelphia, U. S. A.

Cable Address: "BRILL," Philadelphia

London Office: 110 Cannon Street, E.C.

Cable Address: "AXLES," London

American Car Company, St. Louis, Mo.
G. C. Kuhlman Car Co., Cleveland, Ohio
John Stephenson Co., Elizabeth, N. J.
Wason Manuf'g Co., Springfield, Mass.

Cie. J. G. Brill, 49 Rue des Mathurins, Paris

Cable Address: "BOGIBRIL"

Agencies

Pacific Coast

PIERSON, ROEDING & Co., 118 New
Montgomery St., San Francisco;
Los Angeles, Portland, Seattle

Australasia

NOYES BROTHERS, Melbourne, Sid-
ney, Dunedin, Brisbane, Perth

Belgium & Holland

C. DUBBELMAN, 24 Place de Lou-
vain, Brussels

Argentine & Uruguay

SHACKLEFORD & Co., Calle San
Martin 201, Buenos Aires

Natal, Transvaal & Orange River Colony

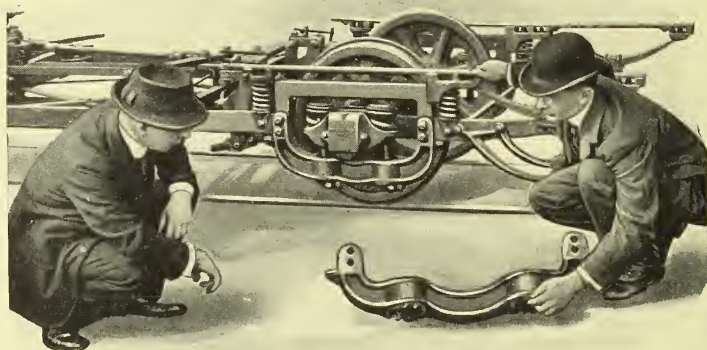
THOMAS BARLOW & SONS, Durban,
Natal

China

SHEWAN, TOMES & Co.
Hong Kong, Canton, Shanghai

Italy

GIOVANNI CHECCHETTI
Piazza Sicilia, 1, Milan



THE BRILL "RADIAX" TRUCK

THE Brill "Radiax" Truck is the culmination of an exhaustive series of experiments in radial axle truck construction. The long swing-links, which of themselves permit a considerable radial movement without assuming excessive inclination, are mounted on spiral springs on each side of the journal box. At the lower end of each link are two pins which engage in grooves on the lower side of the yoke brace. Whenever a movement of the links occurs, one of these pins is forced out of engagement and sets up, automatically, a powerful tendency to return to normal position. This arrangement allows free radiation on curves and holds the car steady on straight track.

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA

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Vol. VIII

JULY, 1914

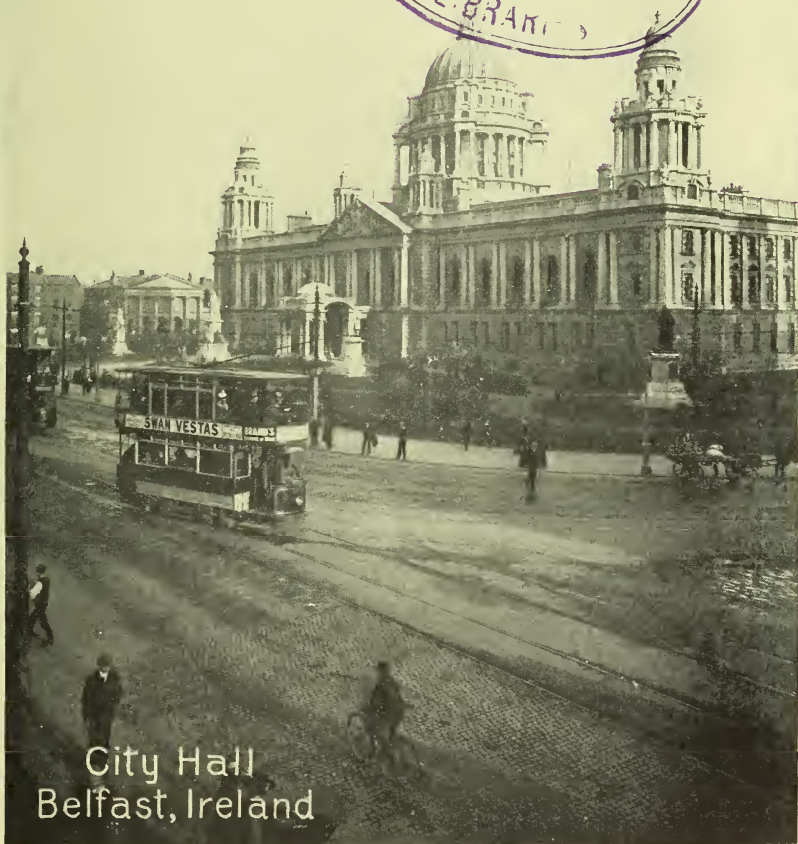
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BRILL MAGAZINE

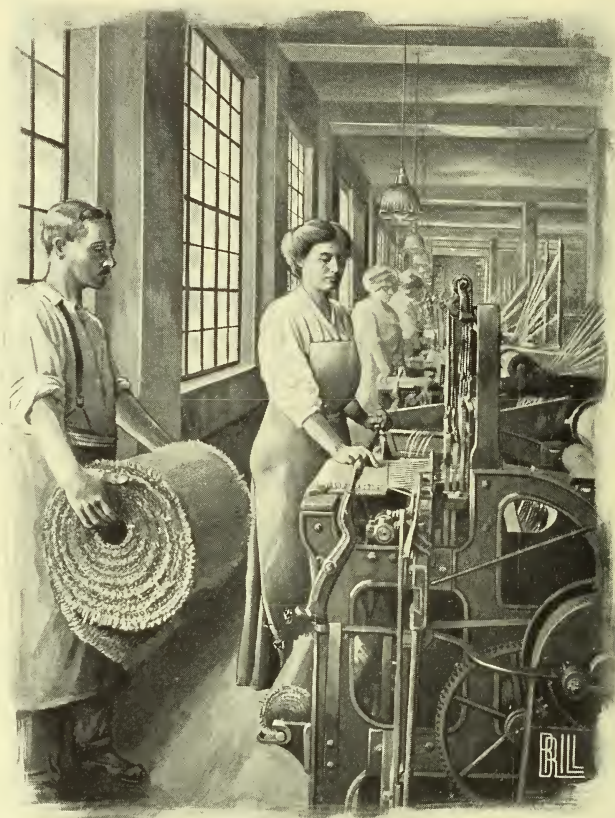
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Brill Rattan Seating Material

BRILL Twill-Woven Rattan Seating Material is made of selected, hard cane, jointed by a process which prevents splitting or fraying. Unlined for seat backs and canvas-lined for cushions. Durable, sanitary, easily cleaned. Ready for immediate shipment in rolls from 18 to 36 inches wide, any length.



Am Taylor

DIRECTOR, DEPARTMENT OF CITY TRANSIT, PHILADELPHIA
PRESIDENT, PHILADELPHIA & WEST CHESTER TRACTION COMPANY

Directness

Directness, in the manner in which it is used here, means the ability to get to the point at once, state it in as few and forceful words as possible, stick to it until it is disposed of, and then drop it.

It is an extremely valuable attribute, and one which more men would do well to acquire. It can be acquired.

The man who possesses it can always get a hearing, can usually carry his point and can always command the respect and, generally, the admiration of those with whom he does business.

For the successful man of today has little time to listen to mere words and polished phrases.

His minutes are worth money, and the man who consumes the fewest of them is his kindest friend.

Volume
Eight

Brill Magazine

Number
Seven

July 15, 1914

Copyright, 1914, by The J. G. Brill Company, Philadelphia, Pa.

A. Merritt Taylor



MERRITT TAYLOR, Director of the Department of City Transit, Philadelphia, and President of the Philadelphia & West Chester Traction Company, was born near Burlington, New Jersey, March 2, 1874. He was educated in the Penn Charter School and the Westtown Boarding School. At the age of 15 years he became an indentured apprentice in a machine shop in Philadelphia. After reaching his twenty-first year, he engaged in the handling of investment securities and became interested in the Philadelphia & West Chester Traction Company, of which he was elected President in January, 1899. In 1902 he and his associates incorporated the New Jersey & Hudson River Railway & Ferry Company, which acquired the properties of the old Fort Lee ferry from 130th Street, New York, to Edgewater, New Jersey, and the electric railway from Edgewater to Englewood. Under Mr. Taylor's management as President, these properties were put in first-class condition, the railway was extended to Paterson and a new line was acquired from Hackensack to Newark. In 1910 Mr. Taylor consummated the sale of the company to the Public Service Corporation of New Jersey. On May 27, 1912, the Mayor of Philadelphia appointed Mr. Taylor Transit Commissioner to investigate the problems of improved transit facilities. Within less than 13 months Mr. Taylor completed his report, which is a most thorough analysis of the questions involved. He outlined a financial plan, devised legislation and was instrumental in securing its passage through the legislature, with the result that the city has before it a complete plan for transit development. Mr. Taylor declined to accept any pecuniary compensation for this important work. He was later appointed to his present office of Director of the Department of City Transit.

Conditions Which Govern the Type of Car for City Service

Belfast, Ireland

FREQUENTLY referred to as the commercial metropolis of Ireland, the city of Belfast, with its extensions, covers an area of approximately 16,500 acres and has a population of 385,500 within the municipal boundaries, according to the census of 1911. In comparison with other cities of the United Kingdom, Belfast is essentially modern, and its history presents little of so much

interest as its continued industrial progress; in fact, no city in Ireland has had such rapid and lasting growth.

Situated in the northeastern part of the island, at the head of Belfast Lough, and about 112 miles north of Dublin, Belfast is the capital of Ulster and, as noted above, the commercial capital of Ireland. In the central part, the city is on fairly flat ground and the eastern and southern districts also are



BELFAST TRAFFIC CONDITIONS AND CARS. York Street, an important industrial thoroughfare, joins Royal Avenue in center of illustration



BELFAST TRAFFIC CONDITIONS AND CARS. Queen's Island Ship Yard service.
During peaks lines of cars stretch as far as the eye can reach

fairly level. There is a considerable slope to the north and west, however, and a few miles north-west of the center of the city is the Divis Mountain Range. North of the city, and within its boundaries, is Cave Hill, which is one of the features of the neighboring scenery, because of its abruptly rising point and the noted likeness of the cliff face to a recumbent figure of Napoleon. On account of the picturesque view obtainable from the summit, this is a favorite point for visitors and is reached by a tramway running from the city, along the Antrim Road, to the base of the hill, from whence one walks to the summit. The present manager of the tramways has a plan

for a tramway from the City Hall to the summit of the hill, but the corporation has not yet decided to undertake it.

The suburbs are well built up, due principally to the fact that Belfast is distinctly a manufacturing city, which necessitates the finer residential districts being located well out from the center. The homes of the laboring classes, however, are, to a large extent, located in the neighborhood of the mills.

In thinking of Belfast, the mind naturally turns to the linen industry, of which the city is the chief center. However, this, by no means, constitutes the entire manufacturing interest of the place, for aerated waters and whiskey are dis-



BELFAST TRAFFIC CONDITIONS AND CARS. Castle Place, through which cars run to Castle Junction, shown in center of illustration



BELFAST TRAFFIC CONDITIONS AND CARS. Royal Avenue where it runs into Castle Junction. The large banks and hotels are in this section

titled for a world-wide trade, and the city contains some of the largest tobacco and rope works in the world. It is also a shipbuilding center of great importance, having

available, the customs duties at the Port of Belfast amounted to £3,-614,089.

Much of Belfast's commercial importance is due to her remark-



BELFAST TRAFFIC CONDITIONS AND CARS. The lines are laid on a radial system, with Castle Junction as the central traffic point

the largest output in the world. Among the principal exports are cattle and ore. Coal and ship plates are the chief imports, and upon them the manufacturing industries of the city depend. During 1912, which is the latest report

ably fine harbor, which was once merely an insignificant creek of the River Lagan. By successive improvements, it has been made one of the finest in the United Kingdom, and the amount of its dues are exceeded only by London and Liver-



BELFAST TRAFFIC CONDITIONS AND CARS. Castle Junction, the central traffic point of the system, where cars pass at the rate of 468 an hour

pool. Much work is still being done and, in time, the harbor will be second to none of its class. At the present time, the available quayage comprises about 25,000 lineal feet. The River Lagan is spanned by four bridges. A large fleet of steam and sailing vessels operates between Belfast and ports in England and Scotland, and carries on an important and growing business in passenger and freight transportation. The city is well supplied with markets, under control of a municipal commission. There are many beautiful parks, among the more important of which are Alexandra, 10 acres; the Botanic Gardens, 17 acres; Woodvale, 24 acres; Falls, 44 acres; Victoria, 63 acres, and Ormeau, the largest, which embraces 100 acres within the park proper.

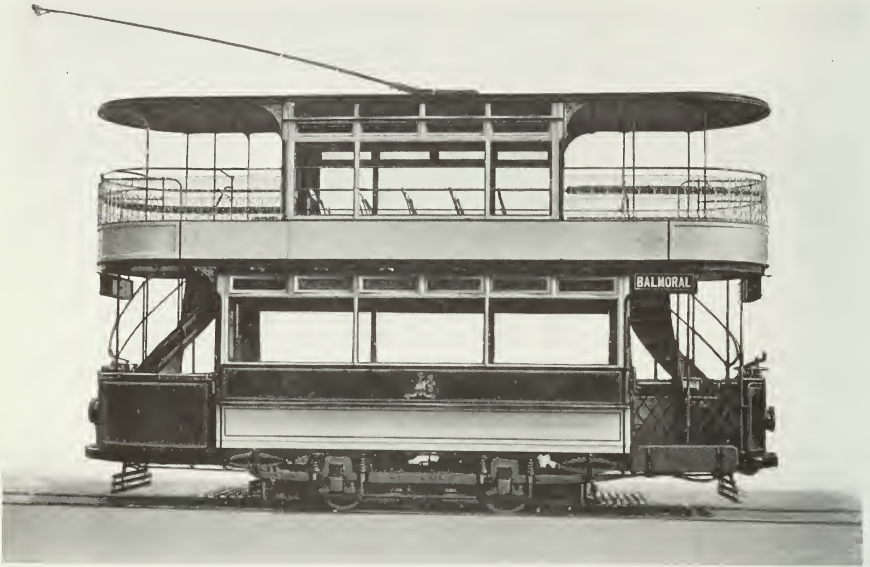
In connection with the harbor improvements noted above, railways have been built which place the docks and quays in direct rail connection with all parts of the country. A subway under the 2,500-ft. Queen's Quay connects the Great Northern Railway with the quay tramways and reduces city traffic at this point to a considerable extent. The principal streets of the city are York, Donegal, North and High, all of which have tramways.

As may be gathered from the foregoing paragraph, the tramway system is quite complete. On December 31, 1904, the control of the tramways passed from the Belfast Street Tramways Company to the Belfast Corporation. Since its ac-

quisition by the city, the system has been completely electrified and greatly extended, the last extensions being brought into full operation in January, 1913. The total route authorized is 50 miles, and the total trackage of the system is somewhat over 49 miles, all but a very small portion of which is double track. The track is laid to a gage of 4 ft. 8½ in.

As will be seen in the accompanying illustrations, the overhead system, with side poles, is used, power being obtained from the Belfast Electric Generating Station. The system has a maximum gradient of 1 in 16, and the radius of the shortest curve is 35 ft. During the financial year ending March 31, 1913, the receipts were £254,376, with 58,437,942 passengers carried over a car mileage of 5,946,659. The revenue per car mile, therefore, may be figured at 10.27d., as against a cost of 5.80d. per car mile. The fares charged are 1d. and 2d., with a half-penny fare for children. Tickets are used, but the railway does not issue transfers.

During the hours of normal service, about 200 cars are in operation. This number is increased to 280 or 300 during the rush hours. In this connection it is interesting to note that the periods of heaviest traffic differ somewhat from those in this country, being from 8 until 10 o'clock in the morning and from 3 or 4 until 7 o'clock in the evening. As the map on page 197 indicates, the city is very well covered by tramway lines, which radiate from Castle Junction, a view



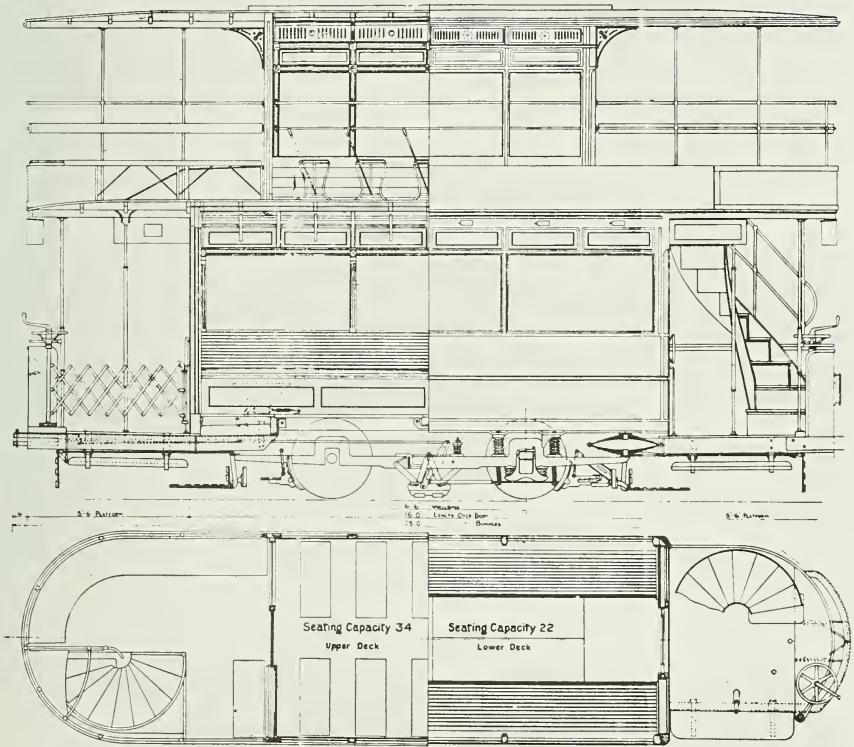
BELFAST TRAFFIC CONDITIONS AND CARS. The standard car seats 56 passengers.
Smoking is permitted on open portions of upper deck



BELFAST TRAFFIC CONDITIONS AND CARS. Lower deck ventilation is secured by means of pivoted sash over the large windows

of which appears on page 198. This is the busiest traffic point on the system, and cars pass at the rate of 468 an hour. One of the interesting features of the system is the Queen's Island service, where up to 16,000 men are employed in the shipyards and for whom trans-

mounted on single trucks, as is the practice in many cities abroad, with a wheelbase of 6 ft. 6 in. The underframes are of wood, suitably reinforced with plates and angles. Wood is also used for the body framing. Platforms are provided with gates and folding steps.



BELFAST TRAFFIC CONDITIONS AND CARS. Track to side sill, 2 ft. 3½ in.; side sill to trolley board, 13 ft. 3½ in.; floor to lower deck headlining, 6 ft. 9 in. Track to step, 14 in.; step to platform, 12½ in.; platform to floor, 8 in. Weight of car body, less electrical equipment, 5½ tons

portation has to be provided twice a day. An excellent illustration of this service appears on page 195.

The standard car used on the system is of the double-deck type shown in the illustration, with the upper deck entirely roofed over and partly enclosed. All cars are

Quartered oak and maple are used in the interior finish of the lower deck. Bulkheads at each end are fitted with single sliding doors. The benches are of the longitudinal type, with slat seats and backs. The window system is interesting, consisting of three broad stationary

sash on each side of the car, with six small pivoted sash above to supply ventilation. These are glazed with opaque, figured glass and are utilized also as racks for advertising cards. The usual hand-straps are provided and, as the illustration on page 200 indicates, each car carries a clock.

The closed portion of the upper

deck is provided with transverse seats, and the window arrangement is somewhat similar to that of the lower deck, except for the size of the sash. Smoking is permitted on the open portions, which are fitted with benches following the curves of the railing on the sides not obstructed by the spiral stairways leading up from the platforms.

Climate, short haul, narrowness and crookedness of streets, slower pace, demand for smoking accommodations and a currency that admits of a zone fare system are some reasons for the retention of the double-deck car in foreign cities.

Thirty-two Passenger Motor Buses

C. & H. Line, Miami, Florida



M IAMI, Fla., did not go through the usual transition from village to town and from town to city, but has the distinction of having been organ-

ized as a city from the start. For all that, it has no street railway service and, until very recently, when Chase & Hardie organized the C. & H. Line of motor omnibuses, the residents had to depend



THIRTY-TWO PASSENGER BUSES FOR MIAMI. During non-rush hours rear door is closed and bus operated by one man



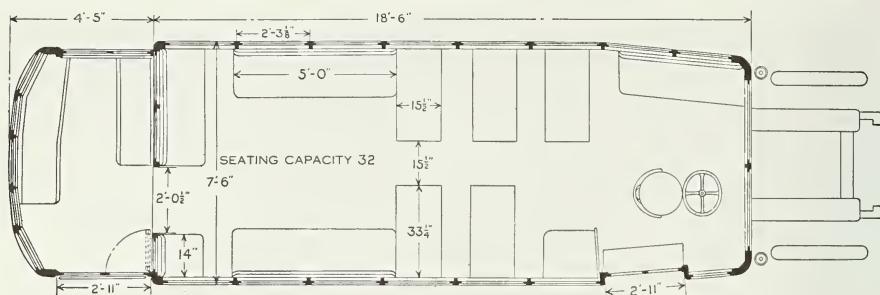
THIRTY-TWO PASSENGER BUSES FOR MIAMI. Wheel housings come under longitudinal seats not interfering with seating capacity

entirely upon private means of transportation. The J. G. Brill Company built the bus bodies used in the new service, the order having been placed through the International Motor Company of New York City.

These bus bodies have wooden frames, suitably reinforced with steel and, as the accompanying floor plan shows, are designed to accommodate 32 seated passengers, with standing room for 18 more. They are mounted on 5-ton Saurer chassis, with wheelbase of 14 ft. 9 1/4 in., and the total weight is only 11,620 pounds.

The door arrangement and method of operation have been worked out in an extremely inter-

esting manner. During rush hours, passengers enter at the rear door, which, like that in front, is a two-leaf folding affair, operated by means of lever mechanism, in conjunction with folding steps. These doors are panelled with wire glass in the lower part, and with clear glass above. The rear door is controlled by the conductor, who collects fares and gives the driver the starting signal by means of a roof bell, when the door is closed. Passengers leaving the bus do so through the front door. During non-rush hours, the rear door is locked, and the buses are operated on practically the same principle as one-man, pay-as-you-enter cars. The fact that they are arranged



THIRTY-TWO PASSENGER BUSES FOR MIAMI. Roadway to side sill, 2 ft. 7 1/4 in.; side sill to roof, 7 ft. 1 1/4 in.; floor to carlines, 6 ft. 8 1/4 in. Roadway to step, 14 1/2 in.; step to platform, 10 in.; platform to floor, 10 in. Weight of body, 4120 lb.

for right-hand drive does not interfere with the ingress and egress of passengers, owing to the arrangement of the front door which, as the illustrations indicate, provides for ample clearance of the driver's seat.

The interior is finished in ash, with exposed carlines. Side windows are of the double sash type and are arranged in a manner similar to that employed on the Fifth Avenue buses in New York, the lower sashes dropping into pockets, while those above are hinged to open inward against bracket supports. The climate of Miami is such that the buses are generally

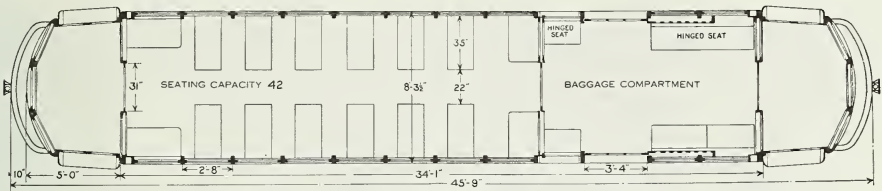
operated with all windows open, but, as heavy rain-storms come up suddenly, it was necessary to arrange for closing the openings quickly, and at the same time to provide for sufficient ventilation. The window system employed has worked out very satisfactorily in practice. The lower sashes of the front windows are arranged to raise, and that on the right is provided with a glass hood in line of the driver's vision. The rear windows, and those in the partition, are arranged to drop. All seats are covered with woven rattan, and hand-straps are provided over the longitudinal seats.

Passenger and Baggage Car for Interurban Service

Jefferson Traction Company

THE Jefferson Traction Company, Punxsutawney, Pa., operates a city and interurban passenger and express service over 38 miles of track, connecting Punxsutawney, Reynolds-

ville, Sykesville and intervening towns and villages. The railway reaches several resorts, among them being Highland, Wisham, Jefferson and Allahoe Parks. It has recently added to its equipment an extremely serviceable type of com-

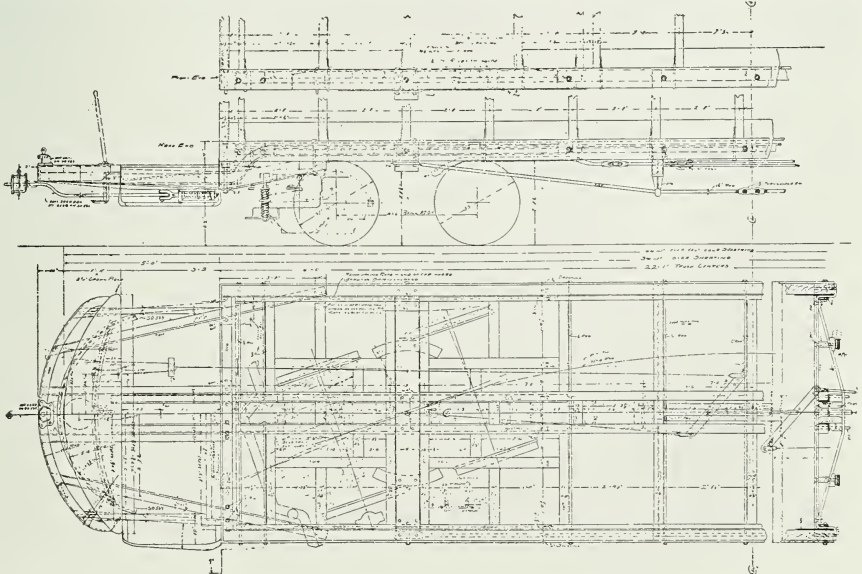


COMBINATION CAR FOR JEFFERSON TRACTION. Track to side sill, 2 ft. 8 $\frac{1}{8}$ in.; sidesill to trolley board, 9 ft. 2 $\frac{1}{4}$ in.; floor to headlining, 8 ft. 2 in. Track to step, 16 $\frac{1}{2}$ in.; step to platform, 14 $\frac{1}{2}$ in.; platform to floor, 9 in. Weight of car body, less electrical equipment, 18,380 lb.

combination passenger and baggage car, built by the G. C. Kuhlman Car Company.

Standard practice is followed in the construction of the underframe, which is of wood, properly reinforced with structural steel plates and shapes. The side sills are 4-in. by 7 $\frac{3}{4}$ -in. yellow pine, plated on the inner side with 15-in. by $\frac{3}{8}$ -in. steel. End sills and crossings are of oak of suitable dimensions. The center platform supports are of wood, reinforced

with 4-in. by 3-in. by $\frac{1}{2}$ -in. angles, which extend from the crown-pieces under the end sills. At this point they are curved upward and extended along the underside of the 3 $\frac{1}{2}$ -in. by 4 $\frac{1}{4}$ -in. center stringer to a point 10 ft. from the end of the car body. Outside platform knees are reinforced with 6-in. by 3 $\frac{1}{2}$ -in. by $\frac{1}{2}$ -in. angles. The maintenance of the horizontal alignment of the underframe is assisted by under-truss rods, anchored at the bolsters and braced



COMBINATION CAR FOR JEFFERSON TRACTION. Diagram of underframe, showing truss rod to maintain horizontal alignment



COMBINATION CAR FOR JEFFERSON TRACTION. A notable feature of the passenger compartment is absence of hand straps



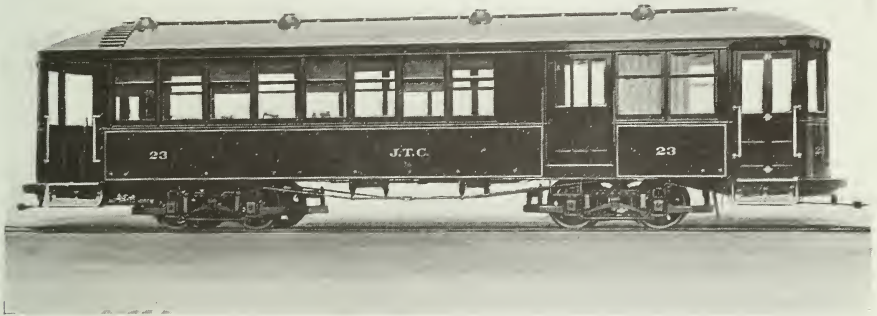
COMBINATION CAR FOR JEFFERSON TRACTION. Baggage compartment has board ceiling instead of usual carline finish

by queen posts at the needlebeams.

The body framing is also an example of standard practice, the corner and side posts being of ash, tenoned into the side sills. The former are $3\frac{5}{8}$ in. and the latter $3\frac{1}{4}$ in. in thickness. Ash carlines support the roof, which is of the plain arch type, and is fitted with eight Brill "Exhaust" ventilators. The platforms

seats, which, as the accompanying floor plan indicates, are placed six on each side of the aisle, are of the Brill "Winner" type.

The baggage compartment windows are of the same type as those in the passenger section, and are protected on the inside by heavy wooden slats, which also form pockets to receive the single sliding doors on either side of the



COMBINATION CAR FOR JEFFERSON TRACTION. Platforms have folding doors and single, stationary steps

are enclosed in round-end vestibules, fitted with three single-sash windows, which are arranged to drop into pockets. At each side of the platform is a single, two-leaf folding door.

The interior of the passenger compartment is attractively finished with cherry, with a light veneer headlining. The windows have straight heads, and are of the double sash type, the upper sashes being stationary, while the lower sashes are arranged to drop into pockets, which are covered with hinged sill sections. All seats in this compartment are covered with woven rattan, and the transverse

compartment. The benches have slat seats and are arranged to fold out of the way of baggage. The ceiling is finished with tongued and grooved boards instead of the carline finish usually employed.

There are bulkheads at each end of the car and between the compartments. These are panelled with glass in the upper part and are fitted with single sliding doors. The car is equipped with angle-iron bumpers, Ratchet brake handles, "Dedenda" alarm gongs, "Dum-pit" sand boxes, signal bells and drawbars of Brill manufacture, and is mounted on Brill No. 27-GE1 trucks.

Frankford, Tacony & Holmesburg Gets New Cars

Brill No. 27-GE1 Trucks

AN order of semi-convertible cars, of an extremely interesting type, was recently completed by The J. G. Brill Company for the Frankford, Tacony & Holmesburg Street Railway Company, Tacony, Philadelphia. The cars have wooden un-

present cars were designed with a view to meeting the conditions and requirements peculiar to this particular service.

Standard practice was followed closely in the underframe construction, the 4-in. by 7 $\frac{3}{4}$ -in. yellow pine side sills being plated on the inner side with 15-in. by $\frac{3}{8}$ -in.



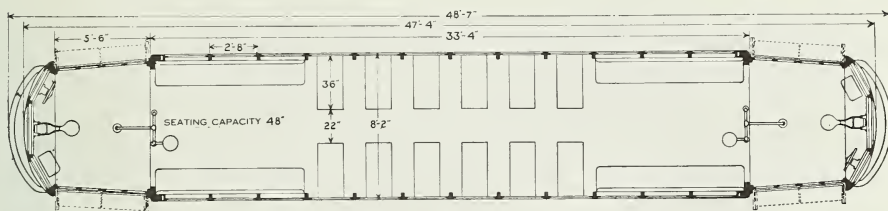
F. T. & H. GETS SEMI-CONVERTIBLE CARS. Long platforms provide ample room for incoming and outgoing passengers

derframes, suitably reinforced with steel, and, as they are intended for both city and suburban service, are mounted on Brill No. 27-GE1 trucks.

The railway operates over about eighteen miles of track, including a trifle over a mile of leased line, and connects Philadelphia with the important suburbs of Tacony, Frankford, Holmesburg and Torresdale. The section it serves is quite populous and, naturally, the

steel. The end sills and crossings are of oak, the two center crossings being reinforced on each side with $\frac{5}{8}$ -in. steel truss rods, running the full width of the car and bearing against the bottom of the crossings at the center, as shown in the diagram. Two center stringers extend from end sill to end sill.

The platforms are supported on outside knees of wood, reinforced with 7-in. by 3 $\frac{1}{2}$ -in. by $\frac{1}{2}$ -in. an-



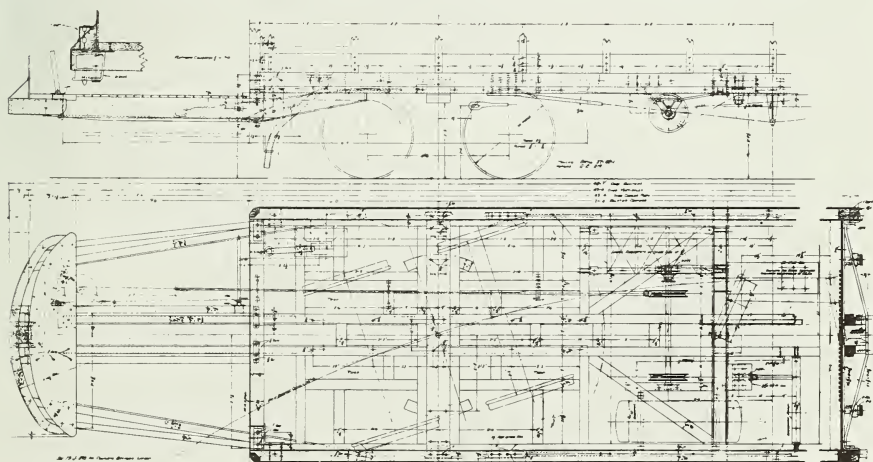
F. T. & H. GETS SEMI-CONVERTIBLE CARS. Track to side sill, 2 ft. 8 $\frac{3}{4}$ in.; side sill to trolley board, 9 ft. 0 $\frac{1}{2}$ in.; floor to headlining, 8 ft. 1 $\frac{1}{8}$ in. Track to step, 17 in.; step to platform, 14 $\frac{1}{2}$ in.; platform to floor, 8 $\frac{3}{8}$ in. Weight of car body, less electrical equipment, 18,500 lb.

gles, and center knees having 4-in. by 3-in. by $\frac{1}{2}$ -in. angle reinforcing. The bumpers are formed of 6-in. by 3 $\frac{1}{2}$ -in. by $\frac{3}{8}$ -in. angles.

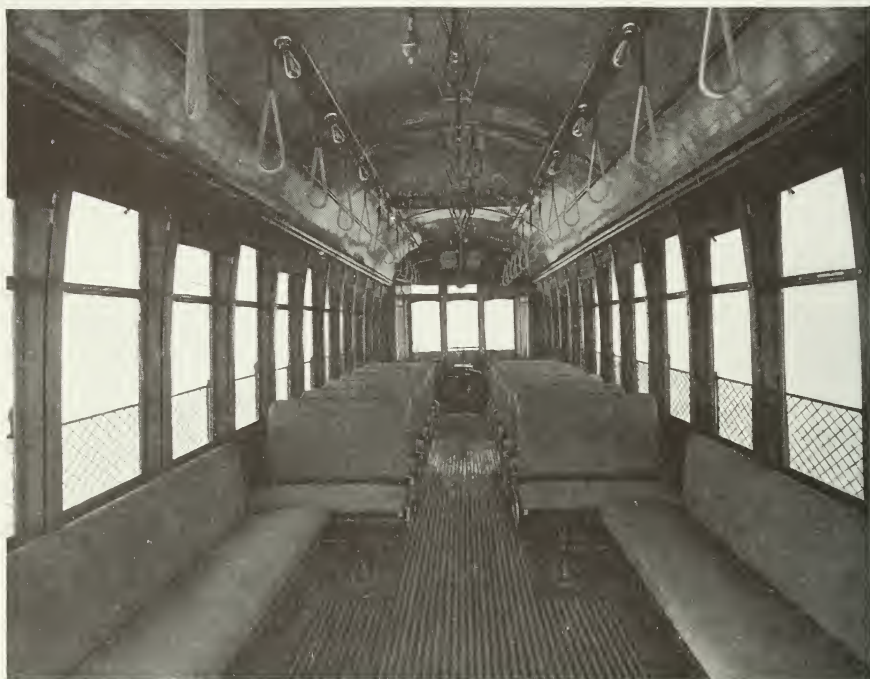
Corner and side posts are of ash, and the straight sides of the car are sheathed with poplar. The roof is of the plain arch type, fitted with eight Brill "Exhaust" ventilators. The platforms are enclosed in round-end vestibules, each having three single sash windows arranged to drop.

The cars are intended for operation on the pay-within system of fare collection, and the conductor's station is located just inside the

car, surrounded by an iron railing, and provided with a seat. Platform doors at all four corners of the car are of the double, two-leaf folding type and have a pipe stanchion at the center to separate incoming and outgoing passengers. Although intended for two-way operation, the cars make nearside stops and consequently the doors are operated separately or in unison by means of a lever mechanism controlled by the motorman. Folding steps work in conjunction with the doors, and are in two sections, similar to the arrangement on the Philadelphia "Nearside" cars.



F. T. & H. GETS SEMI-CONVERTIBLE CARS. Diagram of underframe, showing truss rods at two center crossings



F. T. & H. GETS SEMI-CONVERTIBLE CARS. Passengers enter and leave by front doors at nearside stops

Cherry is used for the interior finish of the cars and the headlining is birch veneer, making an extremely effective combination. The Brill Semi-Convertible Window System employed includes the usual tandem sash and obviates the necessity for wall pockets, thus saving considerable space to be added to the seat and aisle width, in addition to providing more light and ventilation and a means of lowering maintenance costs. The windows are protected on the outside by wire mesh screens. There are no bulkheads.

The interior of the cars is finished in cherry, with birch veneer headlining. The Brill Semi-Convertible Window System employed

obviates the necessity for wall pockets and adds that space to the width of the passenger space, in addition to providing more light and ventilation. The windows are protected on the outside by wire mesh screens.

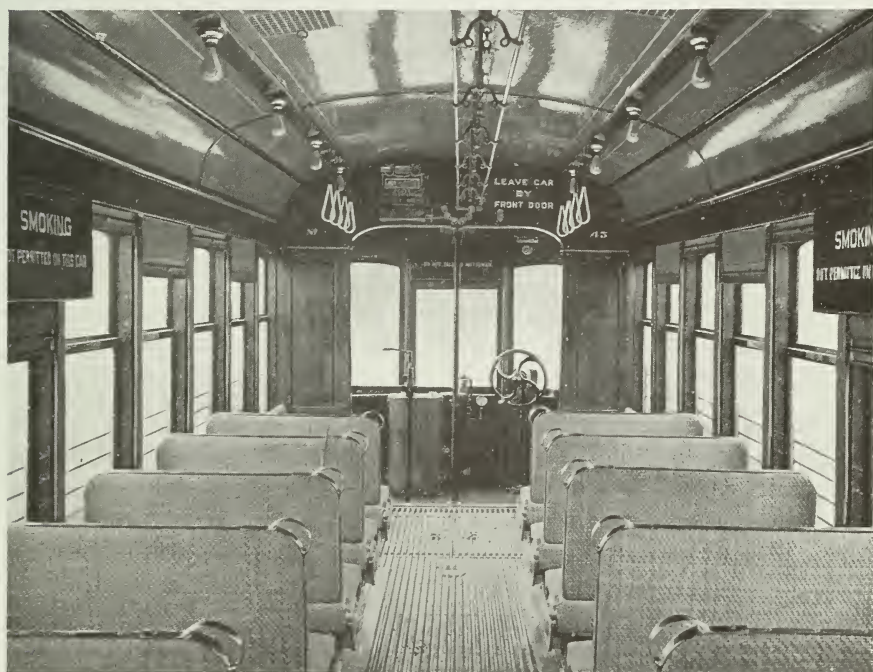
There are six transverse seats of the Brill "Winner" type, and two longitudinal seats on either side, all upholstered with woven rattan. Hand-straps are provided along the full length of the car, in addition to the grab-handles on the transverse seat backs. The cars have the usual push-button system for signalling the motorman, and are fitted with Brill "Dedenda" alarm gongs and "Dumpit" sand boxes.

Steel Cars for Service on Ogden Rapid Transit Lines

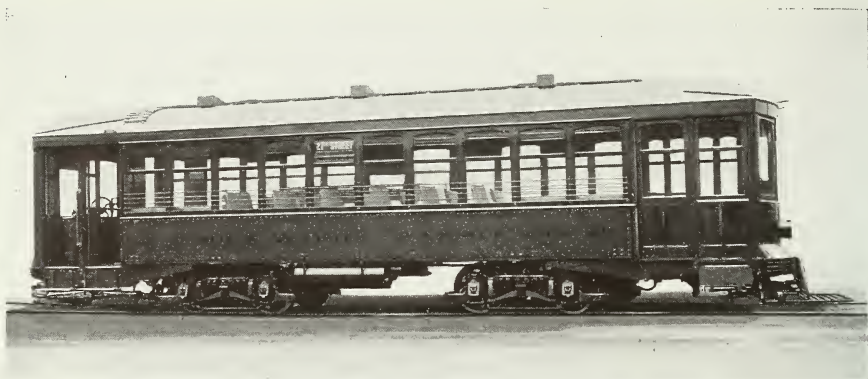
Brill No. 27-GE1 Trucks

THE Ogden Rapid Transit Company, Ogden, Utah, for which the American Car Company recently completed a number of cars of a very interesting type, operates over about fifty-odd miles of track, and, in addition to serving Ogden, connects Smithfield, Providence, Logan and Pleasantview. Probably the most interesting portion of the

system is that which runs through Ogden Canyon, where are located a large sanitarium and a hotel which is a very popular resort for residents of the city. Most of the right of way on this section, even to the post holes, had to be blasted out of solid rock and, as may be imagined, the cost of construction was very heavy. In addition to its passenger service, the company does a large freight business.



STEEL CARS FOR OGDEN. Pipe stanchion in center of bulkhead opening forms part of conductor's station



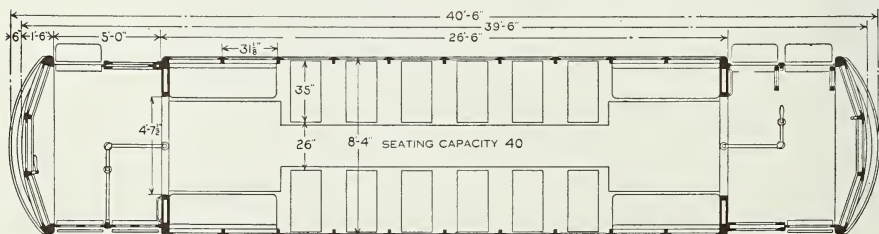
STEEL CARS FOR OGDEN. Continuous framing of upper sashes adds materially to strength of construction

The new cars have steel underframes, with side sills formed of 5-in. by 3½-in. by 3-16-in. angles. These form also the bottom members of side girders, of which the webs are 28½-in. by 3-16-in. plates, and the top members 2¼-in. by 2¼-in. by ¼-in. angles, as will be noted in the accompanying diagram. End sills are 9-in. channels, and crossings consist of 5-in. I-beams, fastened to the side sill angles with angle brackets and ¼-in. gusset plates. The platforms are supported on outside knees formed of 2½-in. by 2½-in. by ⅜-in. angles riveted to the top and bottom of 8-in. by ⅜-in. plates, the whole

having the characteristics of channel knees, and on center knees of 3½-in. by 5-in. by 5-16-in. angles, with yellow-pine fillers. Brill angle iron bumpers are used.

The body framing is interesting, corner and side posts being formed of T-iron of suitable dimensions. The latter extend from the side sill angles to the top rail, the web of the side girder reinforcing angles being cut away to accommodate each post. The plain arch roof is supported on composite carlines.

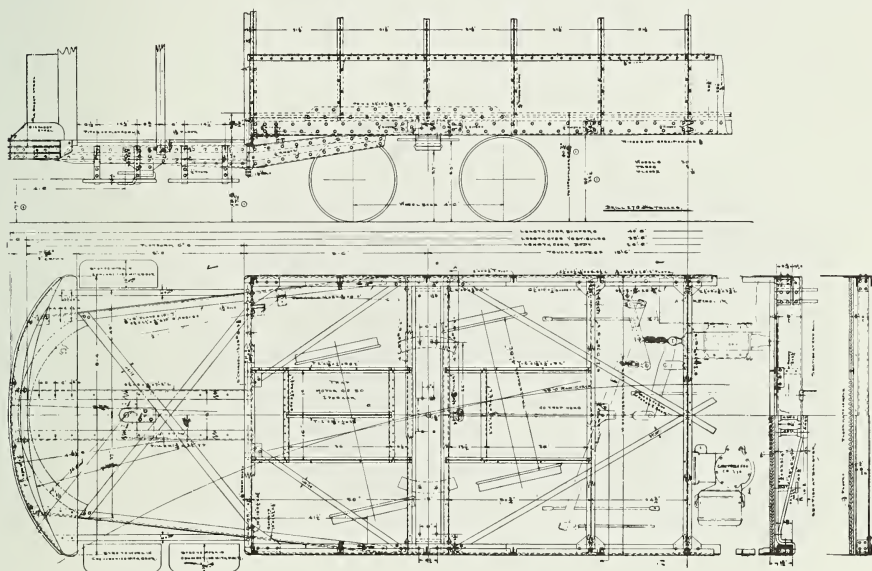
Round-end vestibules are fitted with three single sash windows, arranged to drop into pockets, that



STEEL CARS FOR OGDEN. Track to side sill, 2 ft. 6½ in.; side sill to trolley board, 9 ft. 0½ in.; floor to headlining, 7 ft. 9½ in. Track to step, 17½ in.; step to platform, 14 in.; platform to floor, 9½ in. Estimated weight of car body, less electrical equipment, 16,000 lb.

in the center being adjustable, and are sheathed with sheet steel below the window sills. Platforms are provided with iron pipe railings to separate incoming and outgoing passengers. On the controller side of each platform are double, two-leaf folding doors, operated by means of a lever mechanism, located at the conductor's position. On the opposite side are

Cherry is used in the interior finish, with composition head-lining. The windows are of the arched head, double sash type, set 10 on each side of the car. The top sashes are stationary, and are framed in one continuous piece, while the lower sashes are arranged to raise. There are five Brill "Winner" transverse seats, and two longitudinal seats on each side,



STEEL CARS FOR OGDEN. Diagram of underframe, showing detail of the side girder construction

single doors, which slide into pockets and are controlled by the motor-man. All doors are arranged to operate in conjunction with folding steps.

upholstered with woven rattan. The cars are provided with the usual push-button signal system, and have hand-straps over the longitudinal seats.

There are two ways to build a steel car. One is to support the upper structure directly on the underframe, and the other is to make side girders carry the load. The latter method is preferable in all cases where it can be used.

Light-Weight Single-Truck Cars for Meridian, Miss.

Steel Underframes

SOME cars recently built by the American Car Company for the Meridian Light & Railway Company, Meridian, Mississippi, are interesting in that they show the development of light-weight, steel underframe cars,

formed of 12-in. by $\frac{1}{4}$ -in. steel plates, reinforced along the lower edge with 2-in. by 3-in. by 3-16-in. angles. These angles support wooden sills into which the posts are tenoned. The end sills are 8-in. channels, placed with the web in a vertical position. Crossings are

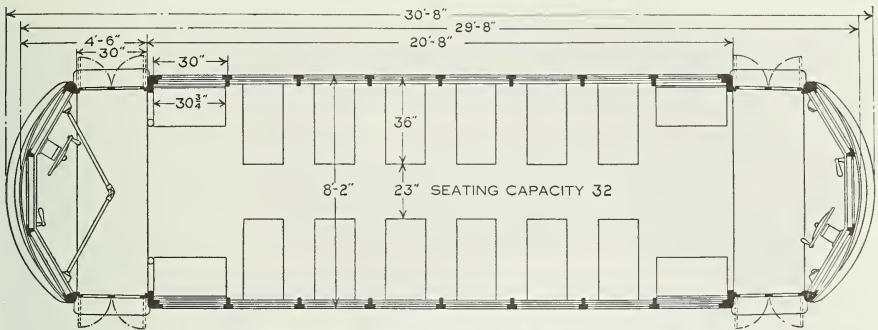


LIGHT-WEIGHT CARS FOR MERIDIAN. The Brill No. 21-E Trucks used under these cars have a wheelbase of 7 ft. 6 in.

mounted on single trucks. With the exception of the substitution of steel for wood in the underframe construction, however, the cars are practically duplicates of an order completed some months ago by the same car builder. The railway company operates over about twelve miles of track in Meridian, a city of 24,000 inhabitants, situated in the eastern part of Mississippi.

The new cars have side sills

4-in. channels, with wood fillers. The crossings immediately in front of and behind the wheels are of truss form, with 3-in. channels as the bottom members. Wheelpieces consist of 3-in. by 5-in. by 5-16-in. angles, extending from end sill to end sill, to which they are joined by means of connection angles. The frame is braced diagonally by 2-in. by 5-16-in. bars. Platforms are supported on outside knees of 4-in. channels, arranged in truss

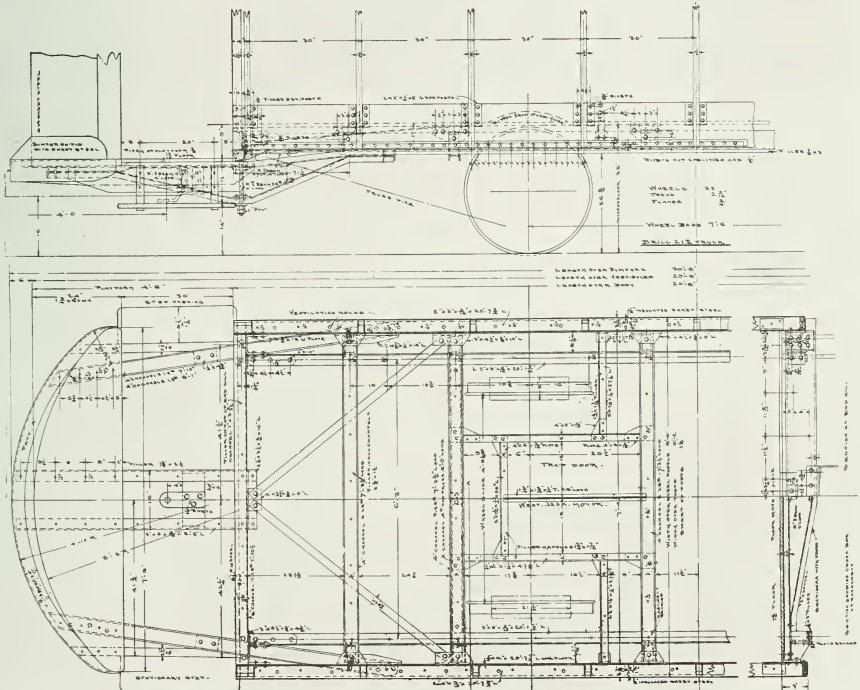


LIGHT-WEIGHT CARS FOR MERIDIAN. Track to side sill, 2 ft. 2 $\frac{3}{4}$ in.; side sill to trolley board, 9 ft. 1 $\frac{1}{8}$ in.; floor to headlining, 7 ft. 10 $\frac{1}{2}$ in. Track to step, 14 in.; step to platform, 12 in.; platform to floor, 9 in. Estimated weight of car body, less electrical equipment, 8000 lb.

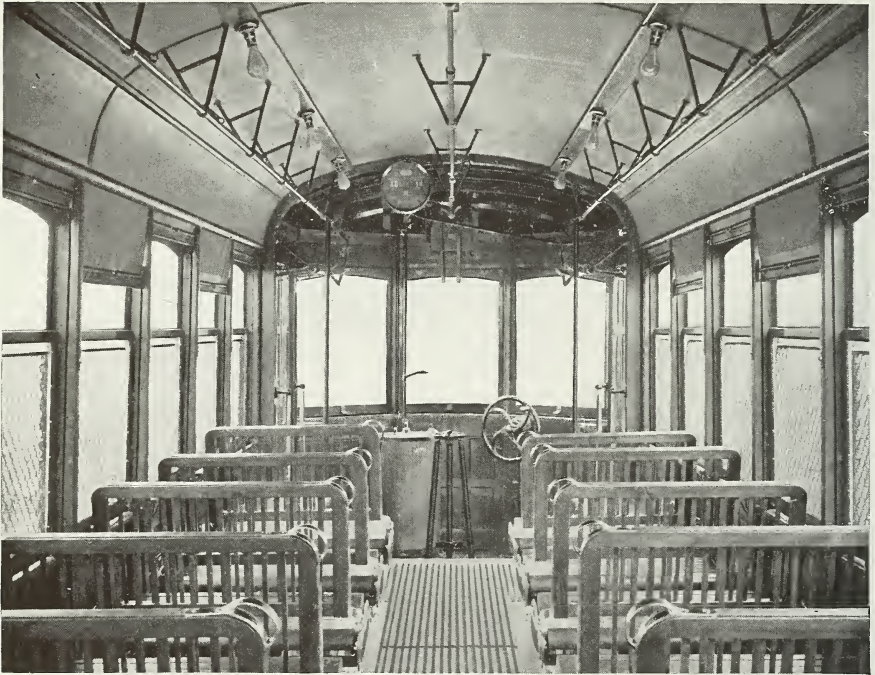
form, and on center knees, formed of 3-in. by 5-in. by 5-16-in. angles.

Wood is used throughout in the body framing, the corner posts being 2 $\frac{1}{2}$ in. and the side posts 1 $\frac{1}{2}$ in. in thickness. The side posts

are supported by means of vertical angles, riveted to the side sill plates. The roof is of the plain arch type. Below the window rail, the sides are sheathed with $\frac{1}{8}$ in. insulated sheet steel.



LIGHT-WEIGHT CARS FOR MERIDIAN. Diagram showing wheel housing which permits the low-hung frame



LIGHT-WEIGHT CARS FOR MERIDIAN. Lever mechanism in front of motorman controls right-hand doors at both ends of car

The vestibules are of the round-end type, sheathed outside below the window sills with sheet steel and fitted with three windows, arranged to drop into pockets. On either side are double doors, hinged to the body and vestibule corner posts, and arranged to open outward. The door operation is interesting, in that the right-hand doors of both platforms are controlled from the front platform, thus making the motorman responsible for the movement of passen-

gers while the car is in motion.

The interior finish is of the No. 1 Palace type, with woodwork of birch stained mahogany, and ceiling of composition. Double sash windows are arranged with stationary upper sashes, framed in one continuous piece, while the lower sashes raise to their full height and are protected on the outside by high, wire-mesh screens. There are six reversible, transverse seats, and two longitudinal seats on each side, made with seats of birch slats.

The evolution of the steel car can be readily traced through the files of BRILL MAGAZINE. The index published in the last issue of each year classifies steel underframe and all steel cars.

Semi-Convertible Cars for Atlantic Shore Railroad Company

Steel Underframe

STEEL underframe semi-convertible cars recently completed by the Wason Manufacturing Company will be placed in service on the lines of the Atlantic Shore Electric Railway Company, Kennebunk, Me.

The railway operates over about ninety-six miles of track, connecting Portsmouth, Dover and Salmon Falls, New Hampshire; Eliot,

Kittery, Kennebunkport, Biddeford and several other populous towns in Maine, and reaching a number of resorts, among which are Cape Porpoise, York Beach and Old Falls. It does an extensive freight business and, in addition to its passenger equipment, owns 30 box, flat and coal cars, one mail car, three express cars, three locomotives, seven snow plows and two ferry boats.



SEMI-CONVERTIBLE CARS FOR ATLANTIC SHORE. Cars have Brill "Winner" seats with grab handles. No handtraps are provided



SEMI-CONVERTIBLE CARS FOR ATLANTIC SHORE. Cars have Brill automatic doors and stationary steps. Photographed on temporary trucks

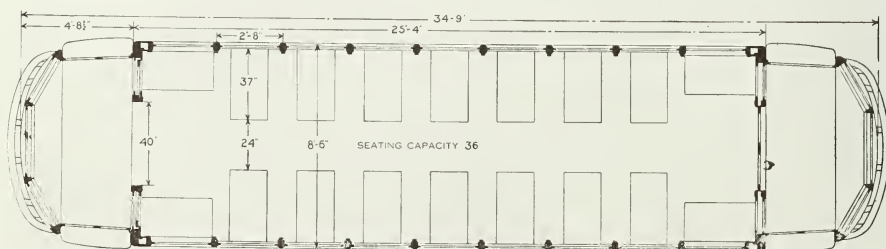
The steel underframes of the new cars are formed of structural shapes and plates. Side sill plates are 16 in. by $\frac{1}{4}$ in., and are reinforced at the bottom with 4-in. by 3-in. by $\frac{1}{2}$ -in. angles, which carry wooden sills into which the posts are tenoned. There is additional reinforcement for the sill plates consisting of 12-in. by $\frac{1}{4}$ -in. plates, 6 ft. long, riveted to the main sill plates and extending an equal distance on each side of the center line of the bolsters.

End sills are 10 in. by $\frac{5}{8}$ in., reinforced in the inner side with 6-in. by $3\frac{1}{2}$ -in. by $\frac{3}{8}$ -in. Z-bars. Crossings are 4-inch channels with

4-in. by $\frac{1}{2}$ -in. plates on the under side, arranged in the form of trusses. A center stringer, formed of an 8-in. channel, placed with the flanges down, extends from end sill to end sill, and is arranged to carry the cables.

The platforms are supported on outside knees of 6-in. by $3\frac{1}{2}$ -in. by $\frac{1}{2}$ -in. angles, which are reinforced under the end sills by $4\frac{1}{2}$ -in. by $\frac{1}{2}$ -in. plates, and on center knees of 4-in. by 3-in. by $\frac{1}{2}$ -in. angles. Brill bumpers are used, formed of 6-in. by $3\frac{1}{2}$ -in. by $\frac{1}{2}$ -in. angles.

Ash corner and side posts are $3\frac{5}{8}$ -in. and $3\frac{1}{4}$ -in. thick, respec-



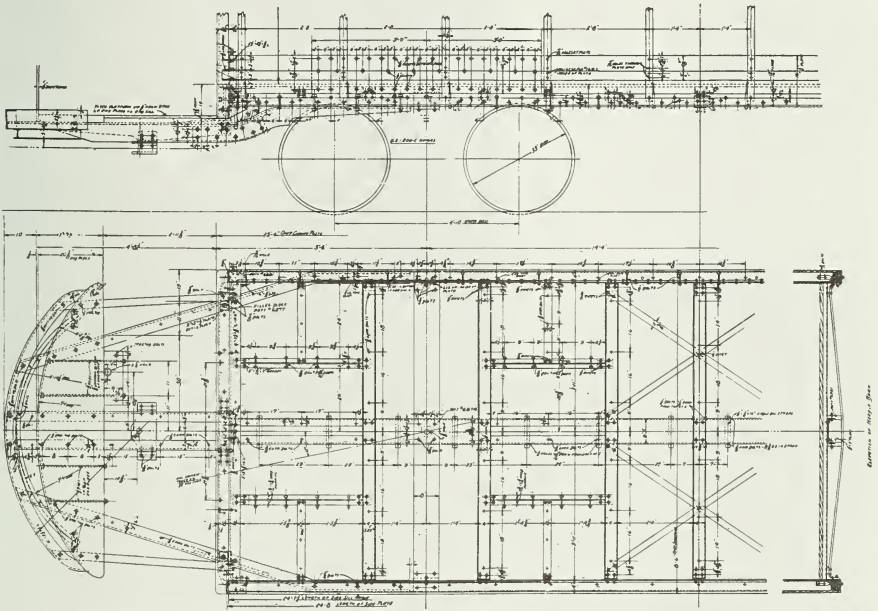
SEMI-CONVERTIBLE CARS FOR ATLANTIC SHORE. Track to side sill, 2 ft. 9 $\frac{1}{2}$ in.; side sill to trolley board, 9 ft. 3 in.; floor to headlining, 8 ft. 2 $\frac{3}{4}$ in. Track to step, 15 $\frac{1}{2}$ in.; step to platform, 14 $\frac{1}{2}$ in.; platform to floor, 10 in. Weight of car body, including electrical and air-brake equipment, 17,700 lb.

tively, and are tenoned into the wooden sills. The roof is of the plain arch type, supported on ash carlines, with the usual steel rafters to take the strain of the trolley apparatus.

The platforms are enclosed in round-end vestibules, each fitted with three single sash windows, arranged to drop into pockets.

vertible Window System.

The interior of the car is finished in cherry, with bronze trimmings and quartered oak veneer headlining. Seven Brill "Winner" seats and two longitudinal corner seats, each occupying the space of one window, are placed on either side of the aisle, and are upholstered with a leather material.



SEMI-CONVERTIBLE CARS FOR ATLANTIC SHORE. Diagram of underframe, showing side reinforcement at bolsters

Body end doors are of the mutually operating, double sliding type, moving into bulkhead pockets. The windows are set nine on each side of the car, and have arched heads and the tandem sash, usual with the Brill Semi-Con-

The cars are heated by a hot-water system, and are fitted with the following Brill specialties: "Dendenda" alarm gongs, "Dumpit" sand boxes, "Radial" drawbars, ratchet brake handles and conductor's signal bells.

In steel side girder construction, it naturally follows that as the height of the web plate increases, the lighter may be the material used.

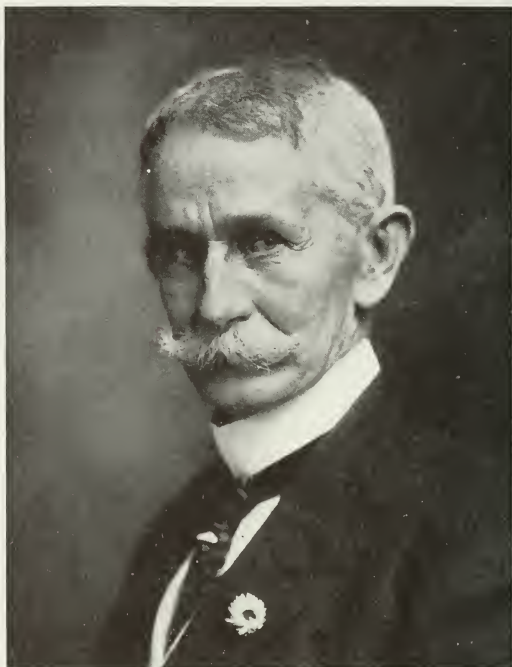
Edward Brill

EDWARD
BRILL, Vice-
President and
Treasurer of
The J. G. Brill

Company, died at his home in Atlantic City, Sunday, June 7th, after an illness of only a week. The funeral took place Thursday, June 11.

Mr. Brill was born in Philadelphia, and was the third and, at the time of his death, the only remaining son of John George Brill who, with his eldest son, George Martin Brill, founded the business in 1868. He was educated in the public schools of Philadelphia and started with the company in 1880 as timekeeper at the old plant at Thirty-first and Chestnut Streets. He rose through several departments to become head of the Lumber Department in 1888. This office he retained until 1906, when he was elected Treasurer and remained in charge of the financial affairs of the company until his death. In 1912 he was elected to the vice-presidency, which he held in conjunction with the treasurer-ship.

Mr. Brill inherited from his father the energetic nature and initiative mind shared by his brothers. He always took a great interest in financial affairs, for the management of which he was well fitted by a remarkable memory for



EDWARD BRILL

details and a keen faculty for exactness. As well as being Vice-President and Treasurer, he was a Director and member of the Executive Committee of the Company, Director and Treasurer of the John Stephenson Company, Elizabeth, and the American Car Company, St. Louis; Assistant Treasurer and Director of the Wason Manufacturing Company, Springfield, and a Director of the G. C. Kuhlman Car Company, Cleveland.

At a meeting of the Board of Directors of the J. G. Brill Company, the following minute was adopted:

“We, the members of the Board of Directors of The J. G. Brill Company, desire by this minute to place among the records of the company, the expression of our sense of personal loss and the loss to the industry he served for all his life, in the death of Edward Brill, Esq., the Vice-President and Treasurer of the company. Mr.

Brill was a gentleman of high character, whose honesty of purpose and strong and fair mind gained for him the respect of all whose privilege it was to work side by side with him; while his genial and never failing courtesy and uniform kindness make us feel with all keenness his loss to us as an associate and as a friend.”

.....



NEW COAL STORAGE AT BRILL PLANT. Coal is dumped from cars into bin, whence conveyer carries it to crusher which handles 50 tons an hour. Five-ton motor rail crane with grab bucket distributes crushed coal to 1500-ton storage bin and to hoppers which feed automatic stokers on boilers

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

No man in this country of ours is what is commonly known as above the law.

That is to say, there are laws laid down for the government of the nation which all men are bound to obey.

And so we come down through the laws of the various states to the municipal ordinances and, finally, to the rules of our own business.

It is not the purpose or province of this article to analyze or criticise the laws of the nation, states and cities.

But it will occur to the mind of any reasonable man that, taken as a whole, the rules laid down by business men for the conduct of their own organizations are usually models which the nation's lawmakers would do well to follow.

Often it may seem that some rule of business is unnecessary or unusually stringent, but analysis will show that every rule was laid down for a good reason, and for the purpose of perfecting organization and accomplishing the greatest good for the greatest number.

When a man disregards the laws of the state, he is certain, sooner or later, to incur trouble, and the consequences are usually serious.

So it is with an infraction of the rules of a business. It may be that the consequences are not so severe or so immediate, but they follow just as surely.

There is a difference in one way, however. Men receive no reward for observing the laws of the state. That much is expected of everyone.

But the man who lives up to the rules of his business and does his work in the manner in which it should be done, is as certain of ultimate reward as the man who does not is certain of trouble.

Moving Pictures While You Ride

A MEANS of stimulating summer night traffic, which has worked out very successfully on a suburban line, consists of a moving-picture entertainment while the car is speeding across country. This particular line had the usual morning and evening peaks, but, after the evening rush was over, traffic was almost too small to warrant running cars until the moving-picture plan was inaugurated. Now, the cars are equipped with a small projecting apparatus at one end, a screen is placed against the forward bulkhead and the passengers may enjoy a cool ride and entertaining pictures.

Working to Have Fun

A HOLIDAY should be a period of relaxation for the man who has to work for a living. It is all right and a fine thing to get out of the city into the open, or to go to an amusement resort, but many men work harder to have what they call a good time on their day off than they do in the company's service. The result is they are played out the next day when they should be rested and ready for a real day's work. Get all the pleasure you have time for and can afford, but don't work too hard for it.

Start and Finish

DON'T start anything you can't finish" may have done well enough for a time as a so-called smart saying, but it never applied to business. When it comes to actual work, the motto should be "Finish whatever you start and make a good job of it." Too many men are given to starting a job and then, through procrastination, which is only a fancy name for sheer laziness, letting it drop.

Compliments and Complaints

NOT long ago a man wrote a letter to a railway company, praising the conduct of one of the platform men. He spoiled the compliment, however, by stating that ordinarily railway employees were so discourteous that any act of courtesy was particularly noticeable and deserved commendation. The experience of this man has been unfortunate. There is no excuse for discourtesy on the part of conductors and motormen; in fact, discourtesy cannot be tolerated, as these men are the direct representatives of the company with the public upon whom the company depends. The men know this and, as a class, they are uniformly courteous even under extremely trying circumstances.

Brill Advertising for July

THE J. G. Brill Company's advertising in the technical magazines during the month of July will deal entirely with Brill trucks. That in the *Electric Railway Journal* will cover the "Radiax" truck, which demonstrations have proved to be the only successful truck of the radial axle type. As is customary with the Brill advertising in this publication, the copy and illustrations will be changed weekly, a particular feature of the truck being dealt with in each issue. The advertising in *Electric Traction* will deal with the new No. 76-E truck, and that in the *Street Railway Bulletin* with the powerful No. 27-MCB truck. As usual, the illustrations in each publication will be handled in a different manner.

An Appreciation

THE experiment of mailing BRILL MAGAZINE so as to secure a simultaneous distribution in the United States, Canada, Great Britain and France on the 15th of the month has worked out successfully, and this plan will be followed hereafter. It will be remembered that readers of the magazine were requested, in the May issue, to inform the Publicity Department of the date on which the publication reached them. This means is taken of expressing appreciation of the kindness of the many readers who responded to this request and thus contributed to the success of the experiment.

Railways and the Public

BEGINNING with the August issue and continuing for as long a time as may be expedient, a number of suggestions for street railway publicity will be published on these last pages of BRILL MAGAZINE. The subjects to be covered will include the relations of the railway with its employees and with the public, advertising in cars and in newspapers regarding the railway's facilities and service and matters affecting the safety of the public. These suggestions will be in line with the publicity and educational plans of the American Electric Railway Association's Committee on Public Relations, and will be for the purpose of furnishing railway executives with leads for their publicity.

Changes of Address

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.

FOR SALE

One 40-Passenger Motor Omnibus

IMMEDIATE DELIVERY

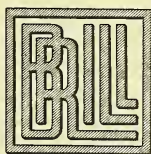


THIS motor omnibus was built for demonstrating purposes and has been run less than 100 miles. Separate entrance and exit doors at front right-hand corner are operated separately or simultaneously, together with their folding steps, by a simple mechanism in front of driver. The stairway at rear is of semi-spiral type with broad treads, and the lower landing is separated from compartment by a bulkhead with sliding door. The lower deck has cane-upholstered seats for 18 passengers, and the upper has slat seats accommodating 22. Complete information and price will be sent on request.

Length over corner posts . . . 19 ft. 0 in.
 Width over sills 7 ft. 1 in.
 Width over posts 7 ft. 6 in.
 Centers of side posts 2 ft. 5 in.
 Height from ground over
 top deck rail 12 ft. 7 in.

Pierce-Arrow (5-ton) chassis.
 Wheel base 16 ft. 9½ in.
 Diameter of wheels 36 in.
 Weight, complete with chassis . 13,200 lb.
 Weight of chassis 6,300 lb.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.



The J. G. Brill Company

Main Office
Philadelphia, U. S. A.

Cable Address: "BRILL," Philadelphia

London Office: 110 Cannon Street, E.C.

Cable Address: "AXLES," London

American Car Company, St. Louis, Mo.
G. C. Kuhlman Car Co., Cleveland, Ohio
John Stephenson Co., Elizabeth, N. J.
Wason Manuf'g Co., Springfield, Mass.
Cie. J. G. Brill, 49 Rue des Mathurins, Paris

Cable Address: "BOGIBRIL"

Agencies

Pacific Coast

PIERSON, ROEDING & Co., 118 New
Montgomery St., San Francisco;
Los Angeles, Portland, Seattle

Australasia

NOYES BROTHERS, Melbourne, Sid-
ney, Dunedin, Brisbane, Perth

Belgium & Holland

C. DUBBELMAN, 48 Rue de Luxem-
bourg, Brussels.

Argentine & Uruguay

SHACKLEFORD & Co., Calle San
Martin 201, Buenos Aires

Natal, Transvaal & Orange River Colony

THOMAS BARLOW & SONS, Durban,
Natal

China

SHEWAN, TOMES & Co.
Hong Kong, Canton, Shanghai

Italy

GIOVANNI CHECCHETTI
Piazza Sicilia, 1, Milan



The Brill "Exhaust" Ventilator

THIS contrivance has a capacity considerably in excess of any Board of Health requirement. No complicated parts. No maintenance costs. Besides its utility, it adds greatly to the appearance of cars.

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA

BRILL MAGAZINE

SMITHSONIAN

OCT 30 1875

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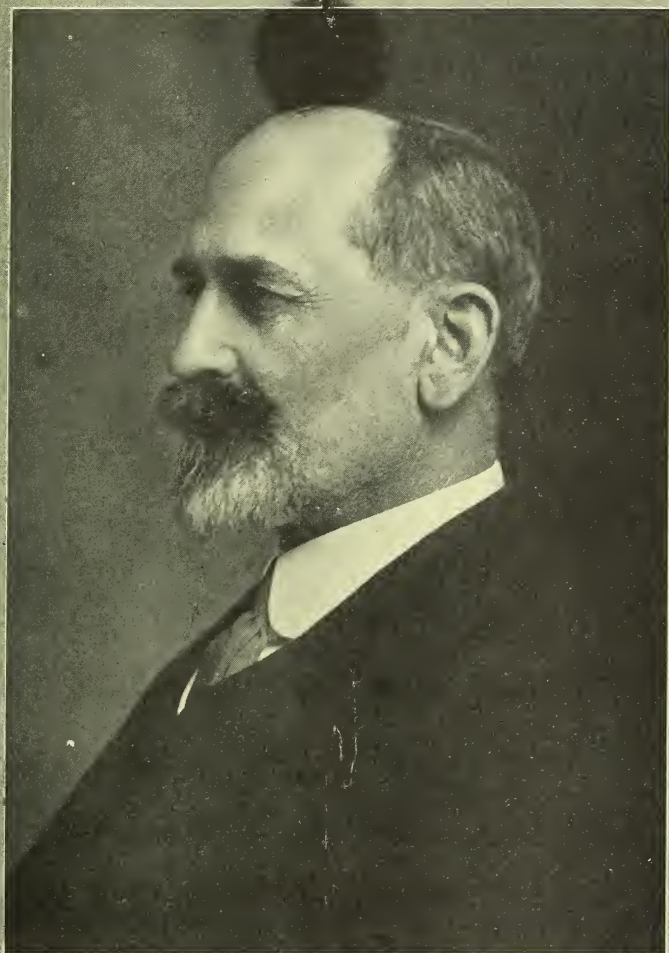


Yonge Street
Toronto, Canada



Brill Dedenda Alarm Gong

THE Dedenda responds to each pressure on the pedal by a clear, penetrating note. There can be no chattering of the clapper as it is so constructed that it must rebound from the gong. Gongs come in 8, 12 and 14-in. sizes. Give thickness of crown piece.



Wm Mackenzie

PRESIDENT, TORONTO RAILWAY COMPANY

Integrity

Integrity is a strong word—one that is rarely used indiscriminately and that is instinctively reserved to apply to the strong as their strongest attribute.

Honesty is frequently used as a comparative and relative term, while integrity, as applied to human character, always means unbroken and unbreakable rectitude, and usually carries with it the implication of large responsibilities.

Integrity is the foundation and supporting structure which makes a tower of strength of the man of capacity and ambition. Never in the history of the world have the bulwarks of industry so needed these towers of strength as at present.

In the field of electric railway transportation the men at the head of operating companies are close to the public they serve, and the service they render is vital to its welfare and growth—a relationship fraught with great responsibilities and opportunities, and demanding integrity above all things.

Integrity is the human quality most needed to stabilize and expand this efficient and beneficent industry.

August 15, 1914

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Sir William Mackenzie

SIR WILLIAM MACKENZIE, one of the most prominent railway men in the Dominion of Canada, was born at Kirkfield, in the Province of Ontario, October 30, 1849. After graduating from the public schools and the Lindsay Grammar School, he took up the profession of teaching for a time. Later, he abandoned that occupation and kept a general store for a number of years, turning from that to the lumber business. It was through this that he became interested in railway construction, to which he finally gave his attention. While engaged in building a section of the Canadian Pacific Railway through the Rocky Mountains, he met Sir Donald Mann and, in 1886, formed the firm of Mackenzie, Mann & Company, which was destined to become a great factor in the railway world. For a decade they built sections of line for others, but in 1896 they began construction on their own account. Their greatest work is represented in the Canadian Northern Railway, 10,000 miles of which will be linked up during the present summer into Canada's second trans-continental railway. Along with this they have the fast Royal Line of steamships plying to Bristol, England. Sir William is actively interested in a great many railway projects and is either President, Chairman of the Board or a Director of the following companies: Toronto Railway Company, Canadian Northern Railway, Halifax & South-western Railway, Inverness Railway & Coal Company, Winnipeg Electric Railway Company, Toronto & York Radial Railway, Canadian Northern Steamships, Ltd., Sao Paulo Tramway, Light & Power Company, Monterey Railway, Light & Power Company, Brazilian Traction, Light & Power Company, Rio de Janeiro Tramway, Light & Power Company, Ontario Electrical Development Company, Shawinigan Water & Power Company and the Canadian General Electric Company.

Conditions Which Govern the Type of Car for City Service

Toronto, Canada

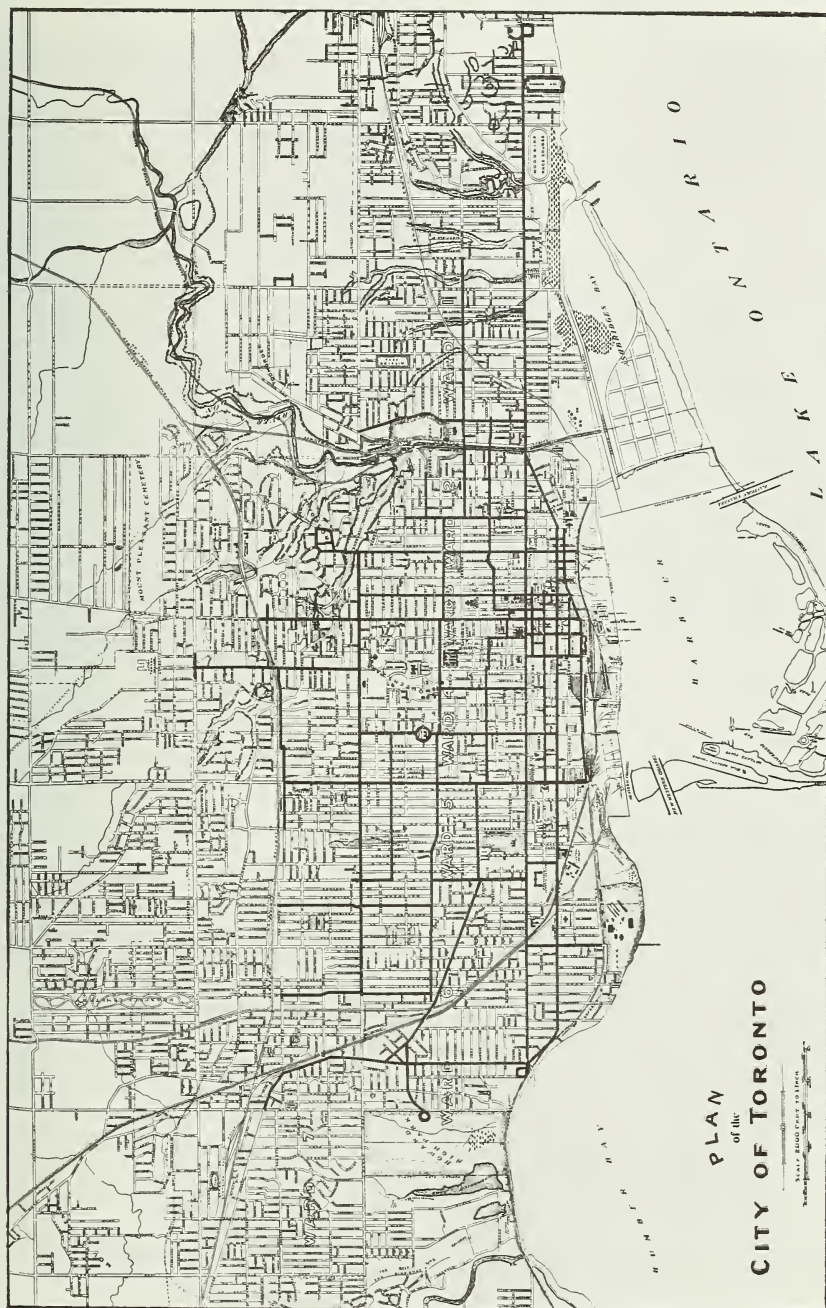
ASIDE from being the capital of the Province of Ontario, Toronto is the second city, in point of size and commercial importance, of the Dominion of Canada. It is situated on the northern shore of Lake Ontario, nearly due north of the mouth of the Niagara River, on a plateau which ascends from the lake shore to a considerable height. The city itself lies on fairly level ground and covers an area of 33.75 square miles. The River Don flows through the eastern part and the River Humber along the western boundary.

In 1749 the French built a small fort, which they named Fort Rouille, and established a trading post on the present site of Toronto. British traders soon appeared from the south, however, and the settlement rapidly lost its distinctly French character. The fort was burned during the French and Indian war in order to prevent its falling into the hands of the British troops. Later, the town was named York and was chosen as the seat of government of the then Province of Upper Canada. In 1813 the city was occupied by the American forces and the legislative buildings and archives were burned. It was later reoccupied by the British and was granted self-government

in 1817. The City of Toronto was incorporated in 1834 with 9,000 inhabitants. The present population is about 450,000, having nearly doubled during the past five years.

A great many important manufacturing interests are located in the city, the principal products being agricultural machinery, cotton goods, flour, foundry products, automobiles and furniture. The number of manufactories is constantly increasing, owing to the abundance of power available from the Niagara Falls electric development and to the excellent shipping facilities afforded by the Grand Trunk, the Canadian Pacific and the Canadian Northern, which make the city a terminal point. The city has a fine harbor, about a square mile in area, formed by an island lying off the water front. The largest of lake steamers enter here and carry on an extensive trade during the season of lake navigation. The city is the distributing point for a rich agricultural district and does a large wholesale and retail business with the interior towns. Aside from this, it is one of the important financial centers of the Dominion.

For all of its commercial importance, Toronto is essentially a city of homes. The better class of residences are detached and are surrounded by ample lawns. As a



TORONTO TRAFFIC CONDITIONS AND CARS. The city's business center is not the geographical center. Lines therefore radiate north and east and north and west



TORONTO TRAFFIC CONDITIONS AND CARS. Yonge at Bloor Street. Rapidly becoming new business center with proportionately increased service



TORONTO TRAFFIC CONDITIONS AND CARS. Spadina Avenue is 150 ft. wide. Cars operate on 10-second headway during rush hours

consequence, the residential districts are spread over a considerable area. There are many fine parks, the largest being High Park, 375 acres, and Island Park, 389 acres. The latter is located on an island across the harbor and is a very popular resort during the summer.

The principal thoroughfare is

ing as they are on one side or the other of Yonge Street. Many of the important business houses, office buildings and the Board of Trade are on this street.

The streets are laid out on a rectangular plan, as the accompanying map indicates, but the business center is not the geographical center, being situated at the southern



TORONTO TRAFFIC CONDITIONS AND CARS. Intersection of Queen and Yonge, where 377 cars per hour pass during peaks

Yonge Street, a view of which appears on the front cover of this issue. This was originally built as a military road in 1796 and extends, under the same name, for a distance of over 30 miles to Lake Simcoe. It is the dividing line of the city, the cross streets being designated as east and west accord-

end of the city, midway between the eastern and western limits. Until recent years, the development of the eastern end has been retarded to quite an extent by the limited facilities for crossing the River Don. As a result of this, the street railway service to the west and northwest has of neces-

sity been proportionately greater than that to the eastern part of the city.

Surface transportation facilities are furnished principally by the Toronto Railway Company, which operates over about 124 miles of 4 ft. 10 $\frac{7}{8}$ -in. gage track, with about 10 miles additional in sheds, yards and on private property. The company's lines, however, are within the city limits as they existed in 1891 and the population directly served is, therefore, not much in excess of 425,000. The additional territory and population are served by municipal lines to the north-east, middle east and north-west.



TORONTO TRAFFIC CONDITIONS AND CARS. Yonge Street north of Adelaide. One of the busiest sections of the city



TORONTO TRAFFIC CONDITIONS AND CARS. College and Yonge Streets. A difficult section owing to layout of streets

Owing to the layout of the city, the lines of the Toronto Railway Company radiate in more or less fan shape from the business center to the north and west and north and east. There are crosstown lines on two of the principal thoroughfares, but all other lines running through the business districts terminate in loops. The radius of the shortest curve on the system is 40 ft. and the maximum grade is 9.38 per cent.

That the service is thoroughly adequate is evidenced by the fact that, during the hours of normal traffic, the company operates 380 cars. This number is considerably increased during rush hours, the railway having 765 motor

cars and 97 trailers available for service, and most of these are in use every night. The rush hour period in the morning is from 6.30 until 8.00 o'clock, being particularly heavy up to 7.00 o'clock and from 7.30 until 8.00 o'clock, during

which periods the factory and department store employees are carried. The evening peak is from 5.00 until 6.30 o'clock. A good idea of the service may be obtained by reference to the accompanying illustrations, especially that on the front cover which shows Yonge Street at the intersection of King, where 472 cars, in trains, are scheduled to cross every hour during the evening rush period.

The system of fare collection employed by the company is interesting. The conductors go through the cars with portable fare-boxes, which are deposited at the division point or, in the case of relief men, are handed over to box collectors

at intersecting points. The boxes are picked up at intervals by a box car and taken to the main office, where the contents are counted. An extremely liberal transfer policy is maintained, the number of transfer passengers during 1913

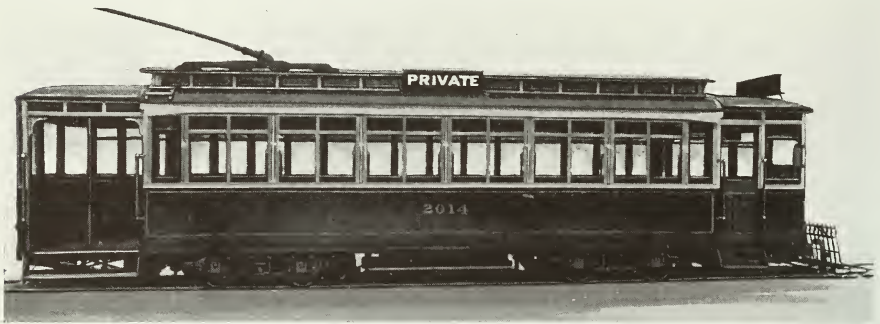
having been 63,083,118 as against 151,236,925 revenue passengers. The car mileage during the same period was 21,366,598.

As the accompanying illustrations show, the cars used by the railway company are out of the ordinary and extremely interesting. They are arranged for single-end operation, and are so constructed that they can be used at all

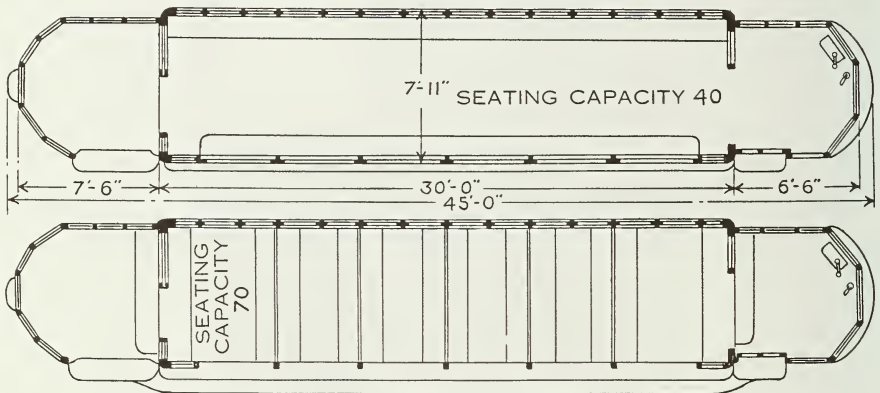
seasons of the year. This is accomplished by building one side in sections which can be removed in summer and transverse seats substituted for the plush cushioned longitudinal seats used during the winter. The underframes are semi-steel. On the convertible side is an 11 in. by 1/2-in. steel plate, prop-



TORONTO TRAFFIC CONDITIONS AND CARS. Bay Street looking toward City Hall. Richmond Street crossing in center. An important traffic point



TORONTO TRAFFIC CONDITIONS AND CARS. Right-hand side panels are removable for open car service during the warm months



TORONTO TRAFFIC CONDITIONS AND CARS. Track to step, 14 in.; step to platform, 12 in.; platform to floor, 10 in. The cars are mounted $2\frac{1}{2}$ in. off center



TORONTO TRAFFIC CONDITIONS AND CARS. Lower step is removable for winter. Top step acts as support for side panels when car is closed

erly trussed to prevent "hogging," while on the devilstrip side, where the ordinary type of body truss can be employed, an 8 in. by 1½-in. plate is used. The removable sections on the convertible side rest on what is the top step when the side is open. This step projects about 3 in. beyond the side panels and acts as a guard. The lower step of the

meet the demands of the service, to mount the cars 2½ in. off center and to taper the posts on the devilstrip side 2 in. from belt rail to roof.

The interior finish of the cars is quartered oak. The cars have no bulkheads and, in winter, a heater is installed in the forward end. The vestibule doors are operated



TORONTO TRAFFIC CONDITIONS AND CARS. Longitudinal seats are placed against side posts and grab handles are not removed in winter

open car connects with the platform steps and is easily removable. The platforms are supported on 5-16-in plates, cut out in cantilever form and riveted to the side sills.

Owing to the fact that there is only 3 ft. 6 in. space between tracks, it was necessary, in order to obtain a car body wide enough to

by means of a lever mechanism.

In addition to these standard cars, the railway uses some single truck cars with a body length of 23 ft., and some trailers which are slightly smaller. Both single truck motor and trail cars are built on practically the same principle as the standard double truck cars.

Additional Center Entrance Cars for Cleveland

Cleveland Railway Company



FEW months ago the G. C. Kuhlman Car Company built 50 center entrance cars for the Cleveland Railway

pleted by the same car builder. Except for a few details, the new cars are duplicates of those built on the former order and, like them, were designed by Terrance Scullin,



CENTER-ENTRANCE CARS FOR CLEVELAND. Pay-as-you-enter and Pay-as-you-leave methods of fare collection. Conductor's position between doors in well

Company, which were a considerable departure from the usual center entrance type, and which were described in the March, 1914, issue of BRILL MAGAZINE. These cars found immediate favor with the public and a supplementary order for 50 cars has recently been com-

master mechanic of the railway company.

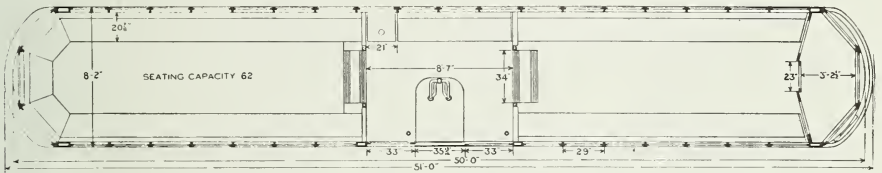
The principal difference between the new and the old cars is in the seating arrangements. The cars built on the former order have longitudinal seats on the devilstrip side and transverse seats on the



CENTER-ENTRANCE CARS FOR CLEVELAND. Both center doors are arranged to slide into pocket between the openings

open side, whereas the new cars are fitted with longitudinal seats on both sides. This arrangement results in slightly increased seating capacity and additional aisle room.

the open side, it is carried over the doorway by means of angle and plate posts which are joined at the top by 3-in. I-beams, angles and plates. The frame is depressed at



CENTER-ENTRANCE CARS FOR CLEVELAND. Track to side sill, 2 ft. 1 1/2 in.; side sill over trolley board, 9 ft. 6 1/8 in.; floor to headlining, 8 ft.; track to well, 12 5/8 in.; well to step, 12 in.; step to floor, 7 3/8 in. Weight of carbody, including electrical equipment, 22,600 lb.

Steel shapes and plates are employed in the bottomframe construction, the sides being of the girder type. On the devilstrip side the girder is continuous and, on

the center, avoiding the necessity of a step from the street to the floor of the center well. At each end of the well are two steps leading to the floor of the car body proper.



CENTER-ENTRANCE CARS FOR CLEVELAND. Mounted on Brill No. 51-E1 trucks


The bottomframe, bolster and bodyframe construction were fully described in the March issue.

The plain arch roof is supported on steel earlines and the cars are fitted with the Scullin systems of lighting and ventilation, which are standard for the plain arch roof cars used by the railway company and were also described in the March issue.

Cherry is used for the interior finish and the seats are upholstered with twill-woven rattan. As the diagram indicates, the cars are intended for single-end operation, and the rear end is provided with a curved bench. The cars are operated on the railway company's pay-enter and pay-leave system of fare collection, which has given great satisfaction in Cleveland.

Twenty-two and Twenty-nine- Passenger Omnibuses

Prepayment and Non-Prepayment Types

HE growing importance of the omnibus as a means of transportation in city and suburb is strongly evidenced by the increased demand for vehicles of this character, a number of which have been described in recent issues of BRILL MAGAZINE. The two buses illustrated are quite dissimilar and represent different method of operation. The one at the top of page 237 was furnished Mr. J. A. Vogt for the Interboro Bus Company, River Edge, N. J., and is mounted on a three-ton Hurlburt chassis, having a wheel base of 13 ft. 6 in. As the illustration shows, entrance and exit is made only by the rear platform. The driver is enclosed in a cab on the forward left-hand side of the body, and has nothing whatever to do with the collection of fares, which is looked after by the conductor. The other type is

mounted on a two-ton Packard chassis, with a wheel base of 12 ft., and was furnished the North Stamford & Long Ridge Road Auto Bus Company, North Stamford, Conn. Entrance and exit is made through the double-folding doors on the forward right-hand side, slightly to the rear of the driver's seat, enabling the bus to be operated as a one-man prepayment bus; the door operation and the collection of fares are looked after by the driver.

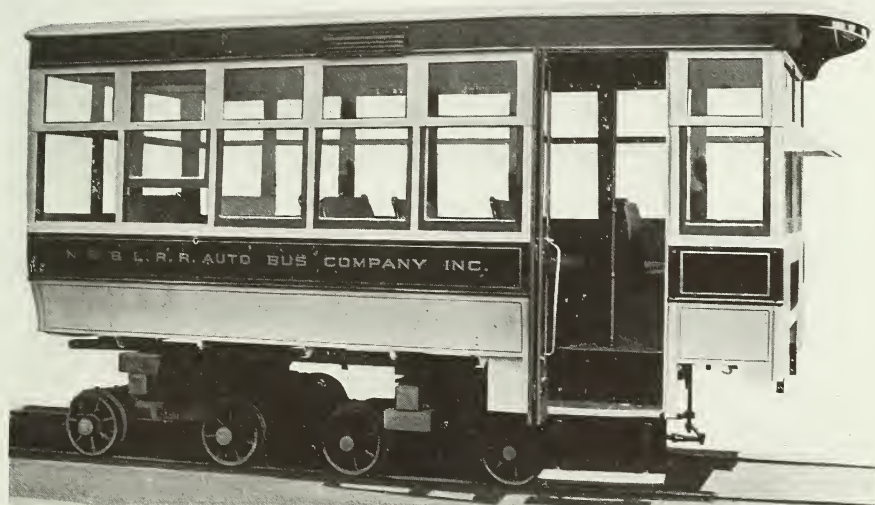
The Interborough Bus Company, Inc., operates in Northern New Jersey between Oradell, New Milford, River Edge, North Hackensack and Hackensack, where it connects with the New Jersey & Hudson River Railway & Ferry Company, running between Paterson and 130th Street, New York. The roof is of the plain arch type, and the window sashes are double, the upper raising and the lower



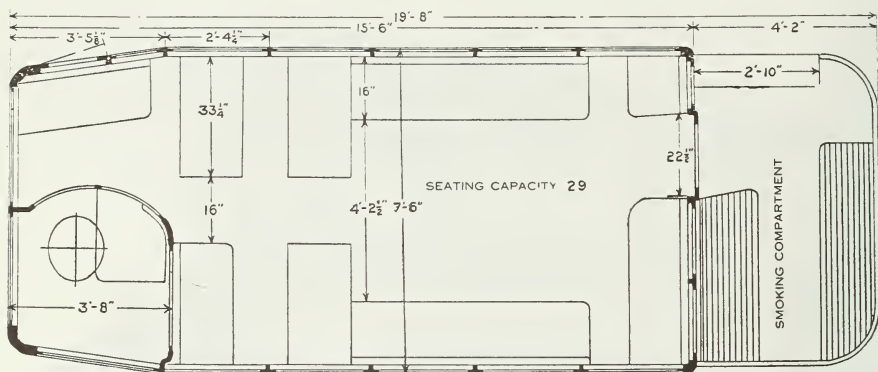
TWENTY-TWO AND TWENTY-NINE-PASSENGER OMNIBUSES. Driver completely enclosed in cab; cab entrance door on left hand side. Three-ton chassis

dropping into pockets; the sash on each side directly over the rear wheels raise. The platform at the rear is provided with a curtain

which, when necessary, is drawn down to the dasher rail. A single sliding door is located in the rear bulkhead. The interior is hand-



TWENTY-TWO AND TWENTY-NINE-PASSENGER OMNIBUSES. Double folding doors and step operated by driver. Two-ton chassis



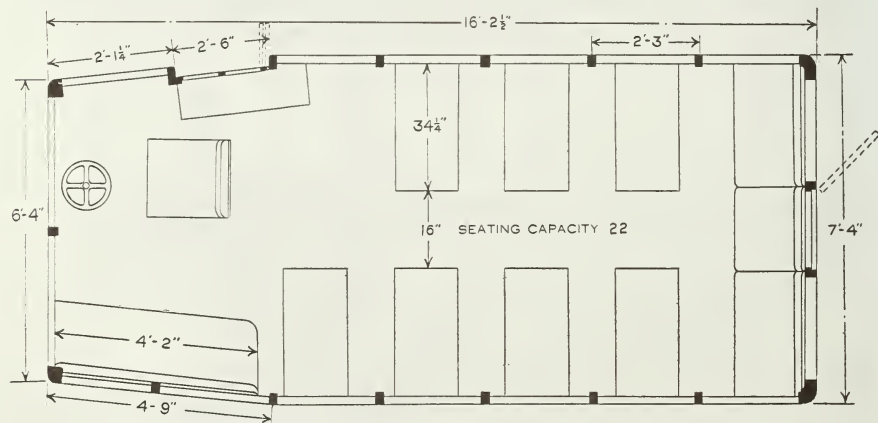
TWENTY-TWO AND TWENTY-NINE-PASSENGER OMNIBUSES. Height from ground to side sill, 3 ft. 5½ in.; side sill over roof boards, 6 ft. 11⅝ in.; floor to headlining, 6 ft. 8⅞ in.; roadway to first step, 16⅞ in.; first step to second step, 13½ in.; second step to floor, 12½ in. Weight of body, 3800 lb.

somely finished in ash, with maple veneer ceiling. The seats are of Brill twill-woven rattan, those placed transversely having stationary backs. The driver's cab is entered through a door on the left-hand side, and is equipped with a comfortable leather seat. Push buttons are provided on the side posts.

Yellow pine and oak are used in the underframe construction, while

poplar and ash are used in the upper framing.

The North Stamford & Long Ridge Road Auto Bus Company, Inc., operates from Stamford, Conn., northward for a distance of about nine miles. The bus purchased is for use on the regular route, where it affords transportation mainly to school children of the rural district attending the newly constructed school centrally



TWENTY-TWO AND TWENTY-NINE-PASSENGER OMNIBUSES. Height from ground to side sill, 3 ft. 2½ in.; side sill over roof boards 7 ft. 4½ in.; floor to headlining, 6 ft. 10⅞ in.; ground to step, 15⅞ in.; step to platform, 13½ in.; platform to floor, 11⅞ in. Weight of body and electrical equipment, 2800 lb.

located in Stamford, and, in addition, may be chartered for excursion purposes.

Oak is used throughout in the underframe construction, side sills being $2\frac{3}{4}$ by $2\frac{3}{4}$ in., and the end sills $2\frac{3}{8}$ by 3 in. The upper framing is entirely of ash, having $3\frac{1}{4}$ -in. corner posts and $1\frac{1}{2}$ -in. side posts. The sashes on both sides are of the two-part type, the upper being stationary and the lower arranged to raise. The windows in the front are the same; the one directly in front of the driver is provided with a shield, which prevents his vision being obscured in

stormy weather. The door opening on the right-hand side is 2 ft. 6 in. wide, and is provided with a two-leaf folding door operated by the motorman in conjunction with the lower section of the double step. A single emergency door is located in the center of the rear, and is equipped with a mechanism which may be operated by passengers. The interior is finished in cherry, and the ceiling is veneered. The seats are of Brill twill-woven rattan, stationary backs, and a section of the back seat is removable in case of an emergency.

New Cars for East St. Louis

Passenger and Smoking Types

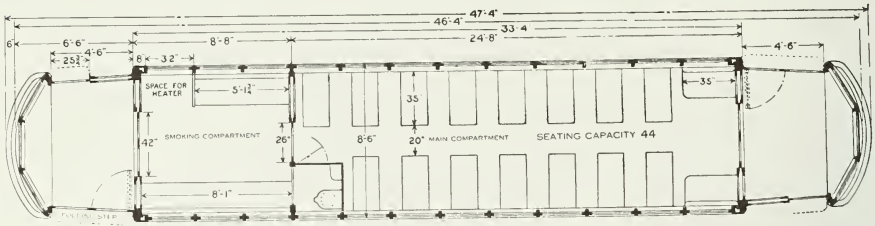
THE East St. Louis & Suburban Railway Company, operating its cars over the well-known Eads bridge across the Mississippi River, and

having a terminus on the western end, connects Belleville, Collinsville, Edwardsville, O'Fallon and Lebanon, Illinois towns, with St. Louis, and, besides affording transportation to those employed in the



CARS FOR EAST ST. LOUIS. Two Z bar knees with wooden fillers support each platform, which is 6 ft. 6 in. long

BRILL MAGAZINE

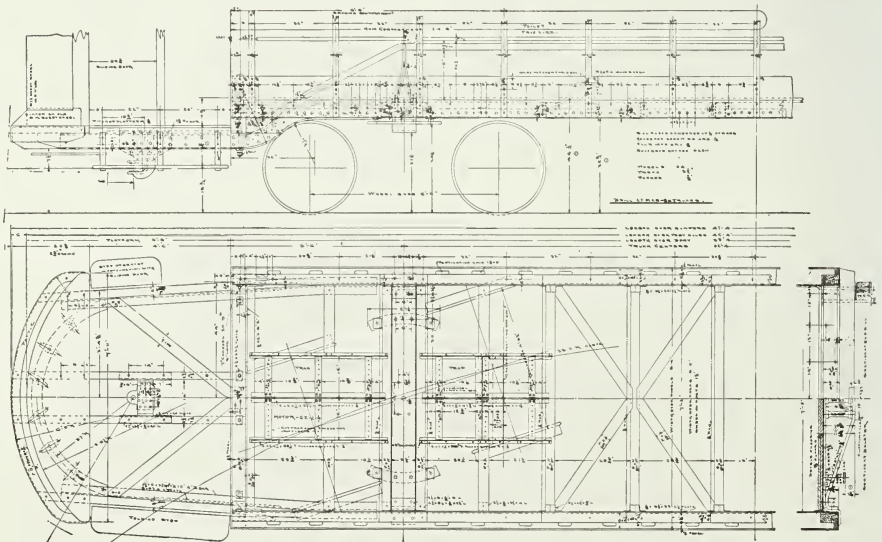


CARS FOR EAST ST. LOUIS. Height from track to side sill, 3 ft. 0 ⁹/₁₆ in.; side sill over trolley boards, 9 ft. 6 ³/₄ in.; floor to headlining, 8 ft. 3 ¹/₄ in.; track to step, 18 ³/₁₆ in.; step to platform, 15 ¹/₂ in.; platform to floor, 10 ¹/₁₆ in. Weight of carbody, less electrical equipment, approximately 19,000 lb.

district mills and factories, carries the products of the smaller towns to market in St. Louis. The company operates 46 motor cars, 4 express cars, and 18 cars of miscellaneous types over 72 miles of track, and, in addition, recently purchased two combination interurban cars, mounted on Brill No. 27-MCB2X trucks and five 23-ft. 8-in. pay-as-you-enter closed cars from the American Car Company.

The car illustrated is similar to a lot of 30 furnished several years

ago, and which were described in the January, 1909, BRILL MAGAZINE. As in the former order, the underframes are composite, the side sills being of two members, the principal one of which is 3 ³/₄-in. by 6 ¹/₂-in. long leaf yellow pine, reinforced with 15 by ³/₈-in. steel plate, with 6 by 3 ¹/₂ by ³/₈-in. angle riveted to the bottom to prevent buckling; the end sills are of oak, 5 ¹/₄ by 6 ⁷/₈ in., reinforced with 6 by ¹/₂-in. steel plate; and the crossings and braces are of



CARS FOR EAST ST. LOUIS. Side elevation and plan of underframe, showing interesting means of platform support

white oak. The upper framing is of ash throughout.

The platforms are 6 ft. 6 in. long, and supported by two knees each, made up of a 6 by 3½ by ⅜-in. Z-bar, with wooden fillers. At diagonal corners on the front and rear platforms are entrance

catches, and can be lowered by the conductor from his position on the platform. The smoking compartment is separated from the main compartment by a single bulkhead with a single sliding door. The longitudinal seats accommodate 10 passengers, but provision is made



CARS FOR EAST ST. LOUIS. Smoking compartment in forward end is provided with heater during cold weather

and exit doors, the entrance doors being enclosed by a two-leaf door folding against the bulkhead and the exit door by a single sliding door operated by the motorman from his position. The folding step on the exit side is operated mechanically by the motorman in conjunction with the door. The steps on the entrance side when closed are held in position by

for the removal of one section to accommodate a heater, thereby reducing the seating capacity to 8. Located in the main compartment, up against the smoking compartment bulkhead, is a toilet and wash room of most recent design. Brill "Winner" seats are used. Continuous basket racks are provided in both the main and smoking compartments.

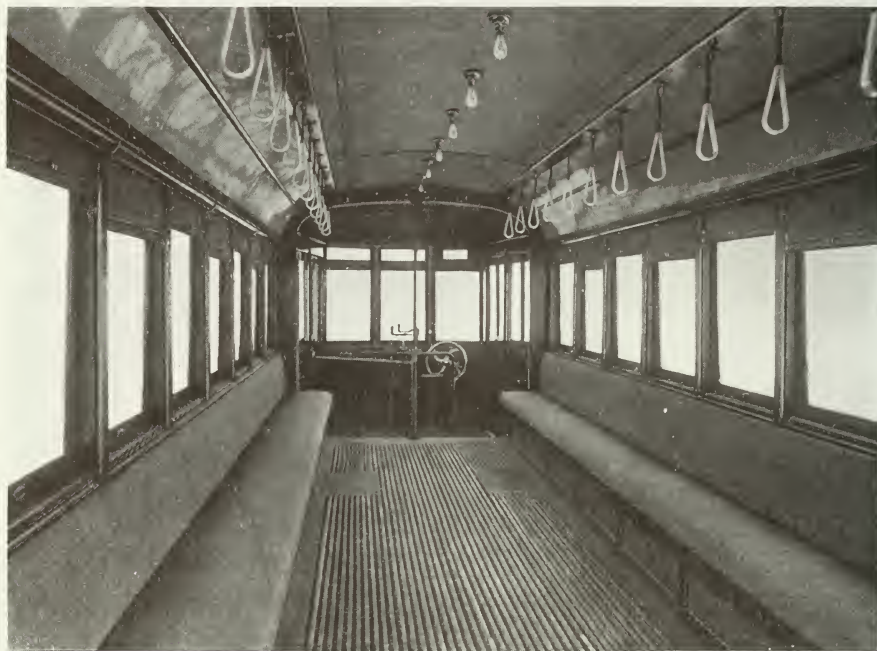
Double-End Nearside Car for Astoria, Oregon

Radiax E1 Truck



AN interesting type of car was recently completed by The J. G. Brill Company for service on the Pacific

single-truck Nearside cars such as furnished Lockport, N. Y., and Charlottesville Va., but the platforms are increased to 6 ft. 7½ in. The railway company's As-



DOUBLE END NEARSIDE CAR FOR ASTORIA, OREGON. Rear doors may be locked and car operated as one-man car

Power & Light Company's lines at Astoria, Oregon. It is of the double-end Nearside type with steel underframe, and is mounted on a Brill Radiax E1 Truck, with a wheel base of 11 ft. The length of the body, 21 ft. over the corner posts, is the same as the standard

toria lines comprise somewhat over five miles of track, and the equipment includes six trail cars, 10 freight cars and a locomotive, in addition to the passenger motor cars. The company furnishes current for power and lighting in Astoria, and also controls the



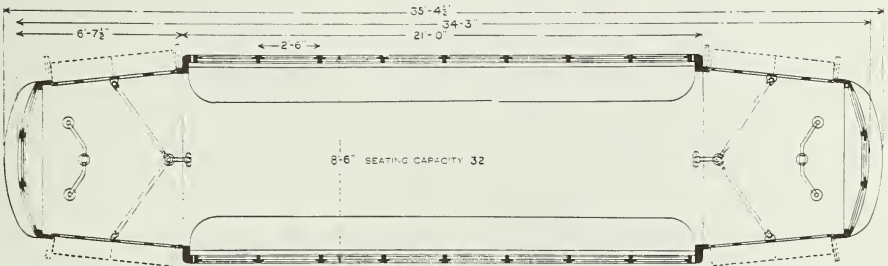
DOUBLE-END NEARSIDE CAR FOR ASTORIA, OREGON. Long platforms having entrance and exit on same side provide ample room for incoming and outgoing passengers. Brill Radiax-E1 truck

Walla Walla Valley Railway Company, operating in Walla Walla, Washington, and an interurban line between Walla Walla and Milton, Oregon.

The underframing is of all-steel construction, two 14 by 3-16-in steel plates reinforced at the top with a 2 by 1 by 5-16-in. angle, and at the bottom with a 2½ by 2½ by ¼-in. angle form the side sills; the end sills are 9-in. channels, and the crossings are of two sizes, 4 and 5-in. channels being

used as shown by the diagram on page 244. The corner and side posts of the body framing are of ash 3¾ in. and 2¼ in., respectively. The convex panels are of poplar, sheathed on the outside with steel.

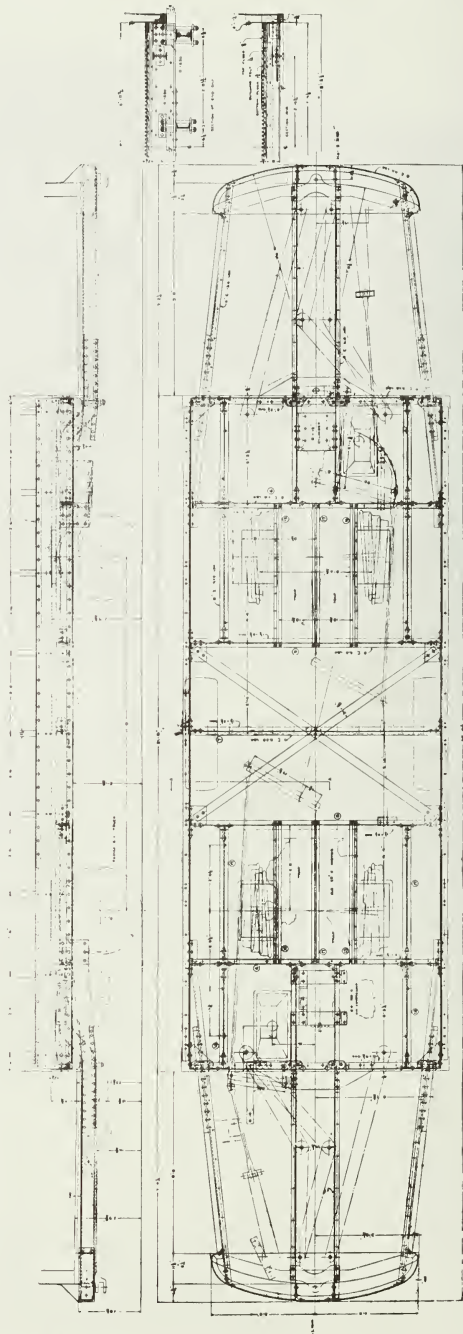
Four ventilators are located on the roof, which is of the regular Brill plain arch type. Entrance and exit is effected on the front platform only, the rear doors being for emergency only, and operated by the motorman from the



DOUBLE-END NEARSIDE CAR FOR ASTORIA, OREGON. Height from track to side sill, 2 ft. 1½ in.; side sill over trolley boards, 8 ft. 6¾ in.; floor to headlining, 7 ft. 5¼ in.; track to step, 12¾ in.; step to platform, 11½ in.; platform to floor, 9¼ in. Weight of carbody, with airbrake equipment, 20,180 lb.

front platform. Two double-leaf folding doors, one opening against the car body corner post, and the other against the vestibule lining, are controlled, together with the folding steps, by the motorman. Besides having the control of the car, the operation of the doors, and the rear door in cases of emergency, the motorman also is called upon to collect the fares at periods when the traffic is light. The window sashes in the vestibule, like those in the car body proper, are of the single light type, dropping into pockets.

The interior is finished in cherry, stained mahogany, and the ceiling is of three-ply maple veneer. The longitudinal rattan seats accommodate 32 passengers. The Brill Radiax E1 truck used with this car is equipped with Brill Half-ball Brake Hangers and latest type of brake rigging, which is a simple arrangement of levers similar in design and principle to the body brake rigging of a double truck car. The brakes are operated by both hand and air, as will be seen in the accompanying diagram, Brill vertical hand wheels being used for the former.



DOUBLE-END NEARSIDE CAR FOR ASTORIA, OREGON. Side elevation and plan of all-steel underframe

Light-Weight Single-Truck Cars for Jackson, Tennessee

One-Man Operation



THE Jackson Railway & Light Company, Jackson, Tennessee, has recently added to its equipment a number of light-weight single-truck

company supplies current for lighting and power.

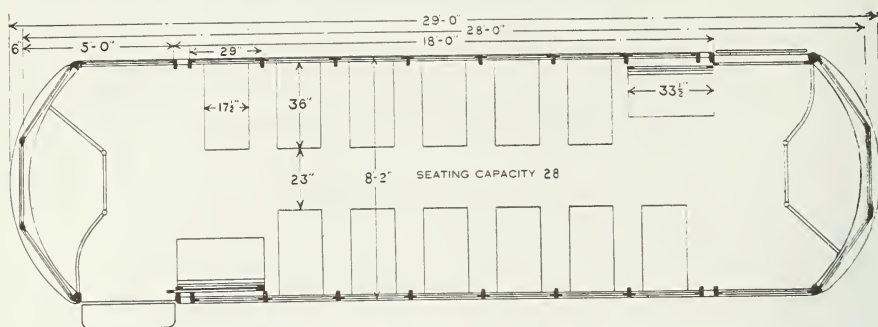
Standard practice is followed in the bottom frame construction, the side sills being of $3\frac{1}{2}$ x $7\frac{3}{4}$ -in. yellow pine, plated on the in-



LIGHT-WEIGHT SINGLE-TRUCK CARS FOR JACKSON, TENNESSEE. Platforms on level with car floor. Mounted on Brill No. 21-E truck

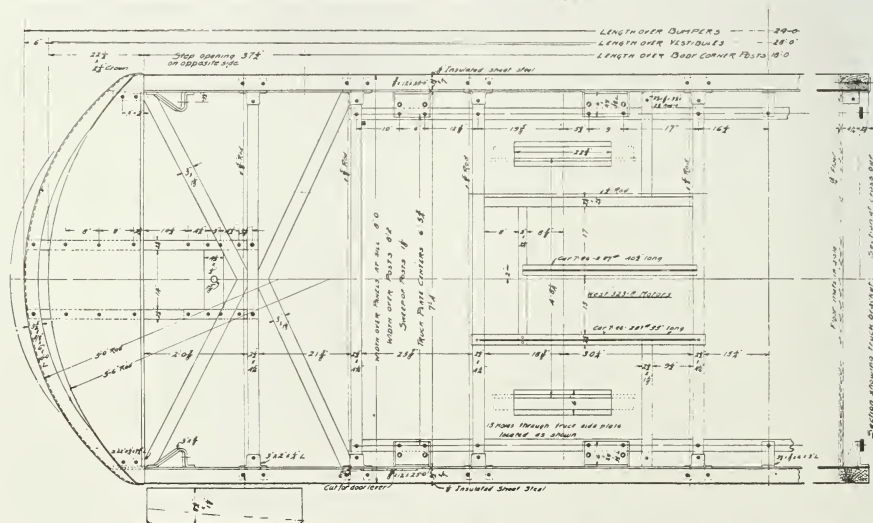
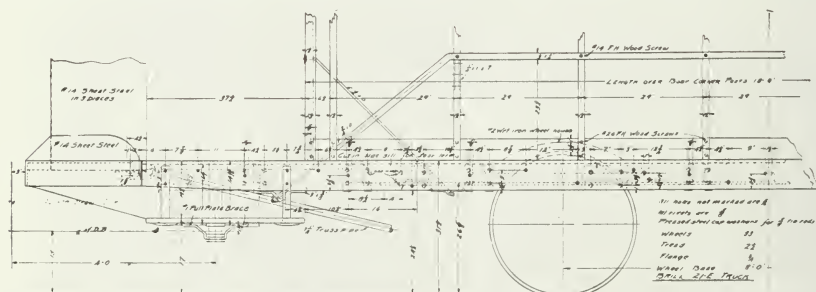
motor cars which, whenever the traffic permits, may be used as one-man prepayment cars. With the exception of the location of the doors, the new cars are identical to a lot furnished the Waycross, Ga., system some time ago. They are mounted on Brill No. 21-E trucks. The railway company operates about seven miles of standard gage track, and reaches Highland Park, an amusement resort which it owns. In addition to the railway service, the

ner side with $12 \times \frac{3}{8}$ -in. steel, as indicated in the accompanying diagram. End sills and crossings are of oak, $2\frac{1}{2}$ by 4-16 in. The body framing is of ash, with both corner and side posts $1\frac{1}{2}$ in. thick. It is due to the continuous framing of the upper sashes that the light-weight post construction is permissible, and this, together with the omission of bulkheads and drop platforms, is an important factor in the reduction of weight. The side elevation dia-



LIGHT WEIGHT SINGLE-TRUCK CARS FOR JACKSON, TENNESSEE. Height from track to side sill, 2 ft. 0 1/2 in.; side sill over trolley board, 8 ft. 10 1/2 in.; floor to headlining, 7 ft. 11 1/4 in.; track to step, 17 in.; step to floor, 14 1/2 in. Weight of carbody, less electrical equipment, approximately 9000 lb.

gram shows the inside truss, which is anchored under the side sill, well forward of the door post, brought up over a steel support on the first



LIGHT-WEIGHT SINGLE-TRUCK CARS FOR JACKSON, TENNESSEE. Diagram of light-weight composite underframe

side post, and carried on the posts immediately under the belt rail. An under truss is brought up from the end of the spring post tie rod of the truck and substantially anchored close to the end of the side sill. These trusses together provide an amply powerful resistance to any tendency to deflection which may be caused by a heavily loaded overhang. The position of the inside truss enables it to serve also as a reinforcement of the belt rail. Note also the steel brace rod, which stiffens the door post against horizontal strains.

The outside sheathing is the American Car Company's insulated sheet steel. The roof is the plain arch type, and is pro-

vided with four Brill "Exhaust" Ventilators. The cars are provided with but two doors, to the motorman's left, which he operates in conjunction with the folding step by a lever on the platform. The lower sash in the vestibule windows are stationary, while the upper drop in metal stiles. The sashes in the body of the car are also of the double type, but the upper are stationary and the lower raise. The interior woodwork, finished in cherry, and the cherry slat reversible-back seats, make an attractive appearance; the ceilings are of composition board. Brill specialties, such as gongs, signal bells, drawbars, brakes, etc., are used throughout.



LIGHT-WEIGHT SINGLE-TRUCK CARS FOR JACKSON, TENNESSEE. The omission of bulkheads is an important factor in reduction of weight



PASSENGER AND BAGGAGE CAR FOR ASHTABULA, OHIO. Forward end of car is equipped as baggage and smoking compartment. Brill No. 27-MCB1 trucks

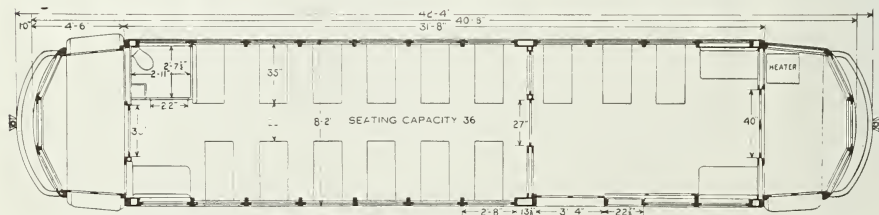
Passenger and Baggage Car for Ashtabula, Ohio

Pennsylvania & Ohio Railway

THE Pennsylvania & Ohio Railway, Ashtabula, Ohio, recently added to its equipment one combination passenger and baggage car, with seats arranged in the baggage room for the use of smokers. The car, which was built by the G. C. Kuhlman Car Company, and mounted on Brill No. 27-MCB1 trucks, is for operation over the company's lines between Ashta-

bula, Kingsville, Conneaut and Jefferson, in the extreme north-east corner of the State. Located along the company's 26 miles of lines are a number of amusement parks, two of which, Woodland Beach and East Lake Park, Ashtabula, are owned by the company.

The underframe is wood construction, with the exception of the section directly under the baggage room door, which has a reinforcing steel plate, 15 ft. by 6 in. by



PASSENGER AND BAGGAGE CAR FOR ASHTABULA, OHIO. Height from track to side sills, 2 ft. 10½ in.; side sill over trolley boards, 9 ft. 4½ in.; floor to headlining, 8 ft. 3¾ in.; track to step, 18½ in.; step to platform, 14½ in.; platform to floor, 9 in. Weight of carbody, with heater, 15,660 lb.

$\frac{1}{2}$ in.; all longitudinal sills are of yellow pine, the side being $4\frac{3}{4}$ by $7\frac{1}{4}$ in., the center, $3\frac{3}{4}$ by $5\frac{7}{8}$ in., and the intermediate, $3\frac{3}{4}$ by $3\frac{3}{4}$ in. The end sills and crossings are of oak, $5\frac{1}{2}$ by $6\frac{3}{4}$ in. and $4\frac{1}{2}$ by $6\frac{3}{4}$ in., respectively. Ash corner posts $3\frac{7}{8}$ in., and side posts $2\frac{1}{4}$ in., are the main members of the upper structure, and are sheathed on the outside with poplar boards. Compensation for the door opening is secured by the use of a 2 by $\frac{3}{8}$ -in. steel truss on each side of the baggage compartment. On the door opening side, after extending from the front end of the side sill, it rises about two feet on the second side post

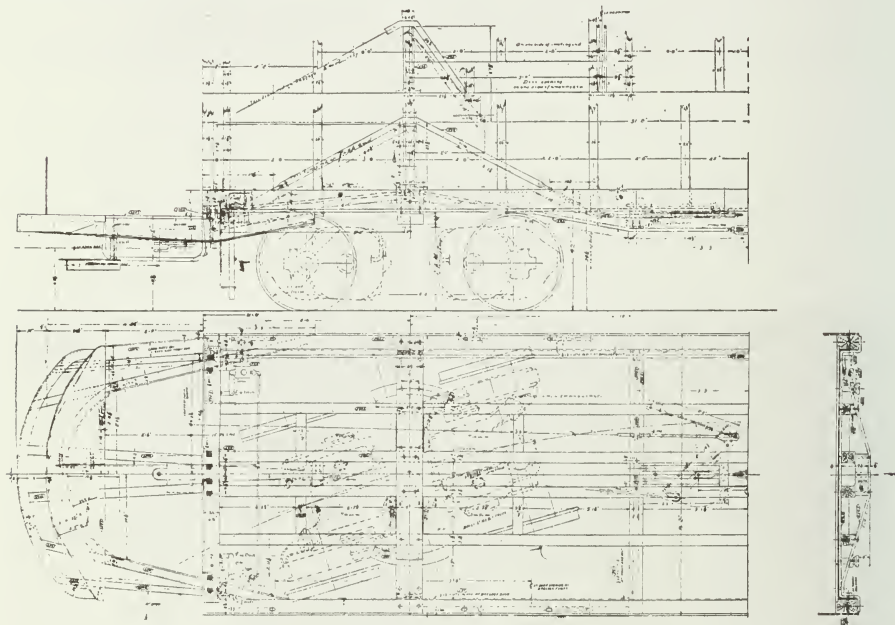
directly over the body bolster and terminates in the end sill under the door post, and anchored on the underside. Brill two-leaf automatic folding doors enclose the door openings on both sides of the rear platform and on the baggage door side of the front platform, the other side being completely closed and paneled. The door opening leading into the baggage room from the front platform is equipped with two doors of the mutually operating type; the other doors in the car body are of the single sliding type. The side sashes are double, the upper half being stationary and the lower arranged to raise. The sashes in the



PASSENGER AND BAGGAGE CAR FOR ASHTABULA, OHIO. The upper sashes are stationary and the lower raise their full height. Non-reversible seats

vestibules drop completely into pockets being of the single type. The interior is finished in cherry, and the seats are of Brill twill-woven rattan with stationary backs. Three transverse seats and two longitudinal seats are provided in the baggage compartment for the use of smokers, and the

passenger compartment accommodates 26, as shown on the seating plan on page 250. In the rear of the passenger compartment and against the bulkhead, is a toilet room with floor covered with $\frac{1}{8}$ -in. sheet steel. Space is provided on the front platform for the installation of a heater.



PASSENGER AND BAGGAGE CAR FOR ASHTABULA, OHIO. Diagram of underframe, showing plate under baggage-room door and trusses giving ample reinforcement

That the day of the radial axle truck has finally and fully arrived, is well known to most operators of city railways and students of railway equipment. The field of this truck has recently become more clearly defined and is of increasing importance, and has only been waiting till the correct principles of design and construction were completely developed before making broad use of the opportunities the truck affords for greater efficiency and economy.

Combination Baggage and Express Cars for Trenton

Brill No. 27—M-C-B Trucks

THE New Jersey & Pennsylvania Traction Company, Trenton, N. J., has added to its equipment some combination baggage and express cars recently completed by The J. G. Brill Company. The railway operates over about 14 miles of track, connecting Trenton, Princeton and Lawrenceville. It grants trackage rights and terminal facilities in the city of Trenton to

the Bucks County Interurban Railway Company, on whose own lines one of the cars will be used.

Although the exterior appearance of the cars is practically identical, they represent two distinct types of underframe construction. One type is built of steel and, in addition to fulfilling its function as a baggage and express car, is intended to be used, as occasion demands, for hauling steam railroad freight cars in trains up to 200



BAGGAGE AND EXPRESS CARS FOR TRENTON. Double sliding doors at each side have 7-ft. openings

tons maximum. This type, as the diagram on page 253 indicates, has side and end sills formed of 9-in. channels. Crossings consist of 13-in. channels, and there are three stringers formed of 13-in. I-beams, the whole making an exceptionally strong combination and one well calculated to withstand the strains of the service without adding unduly to the weight. This type is mounted on Brill No. 27-MCB2 trucks, arranged for standard gage, and is provided with push-pole castings at all four corners.

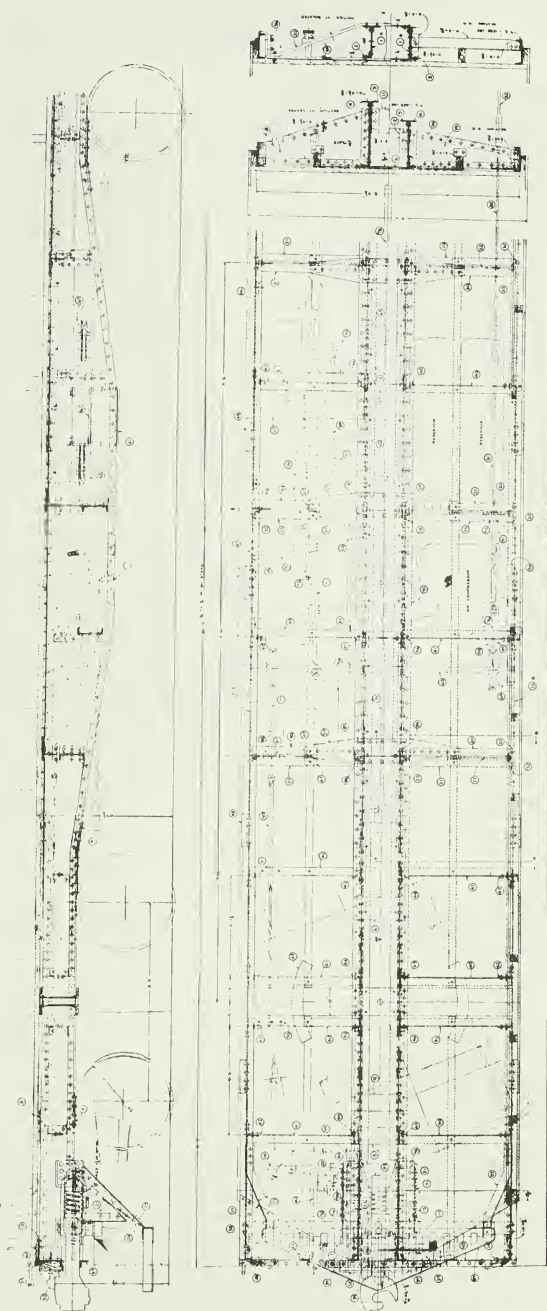
and needlebeams are of oak of suitable dimensions. There are two intermediate sills formed of 5-in. I-beams and two center stringers of 7-in. I-beams, extending from crownpiece to crownpiece. Brill No. 27-MCB2-X trucks are used, set to a track gage of 5ft. 2¼ in.

Wood is used in the body framing of both types, the corner and side posts being straight and having a respective thickness of 3¾ in. and 2¾ in. The outside sheathing is poplar, and the cars are finished inside in standard baggage car style, the roofs being of the plain arch type, and the ceilings having a carline finish, with the roof boards showing.

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round-end type, fitted with two windows. At the motorman's left is a hinged door which is glazed in the upper part. A window is placed on the right side of each vestibule to enable the motorman to receive signals and orders. All windows are of the double sash type, with stationary upper sashes and lower sashes arranged to drop into pockets. Iron pipe railings at each end separate the motorman's position from the body of the car.

There are double sliding doors, with a 7-ft. opening, in the center of each side. These slide into pockets formed of heavy wooden slats and, like the motorman's doors at each end, are provided with freight car steps. Hinged shelves are provided for small express matter and at one end, next to the motorman's railing, is a conductor's desk. Provision is made for the installation of coal stoves to heat the cars in winter. Brill "Dedenda" alarm gongs, conductor's signal bells and "Dumpit" sand boxes are used.



BAGGAGE AND EXPRESS CARS FOR TRENTON. Diagram of underframe of locomotive car, showing powerful steel construction

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

One of the biggest mistakes any man can make is to lose control of his temper.

And to railway men, especially platform men, this applies with greater force than to men in practically any other line of endeavor.

In the first place, a man whose work brings him in constant touch with the public cannot afford to lose his temper.

The minute he lets go of his self-control, he places himself at a disadvantage from which he cannot recover.

Further than that, he arouses in the person with whom he is dealing an antagonism that is bad for him and bad for the service.

Still further, the loss of self-control impairs efficiency, because no man who loses his temper can recover immediately, and it is impossible to nurse a grievance and do good work at one and the same time.

By controlling the temper any situation can be met and dealt with evenly and in perfect order, to the distinct advantage of all concerned.

About the worst things a man can stock his memory with are angry words given or taken. He should forget them as quickly as possible and clear his brain of such bad material.

An angry passenger almost always tries to turn an unfortunate happening into a personal grievance between himself and the conductor or motorman. A wise employe will not allow it to become personal, because he will not argue, nor will he, by word or act, increase irritation, but will briefly and courteously state the ruling or the common sense governing the case and return at once to his regular duties.

Railways and the Public

IT has been said by some railway men that the public will take all it can get and clamor for more. There is doubtless considerable truth in this, but it is the experience of many who have had dealings with it, that this same public is very amenable to reason and appreciative of facts. Now, every railway endeavors to serve its public to the best of its ability, but one great trouble that is apparent in some quarters is that the railway company wants the public to find this out for itself and makes no special effort to let the public know what it is getting in return for its nickels. Unfortunately, the American public has been encouraged to believe that it is constantly being "done" by public utility companies. It is sometimes difficult to overcome this belief, but it can be done if gone about in the right way and followed up persistently. Those in the business know that there are sound operating reasons for everything a railway does, but the public does not know, and consequently it complains. To overcome this, the railway should tell the public what those reasons are. It can be done through newspaper advertising if the question involved is big enough to warrant the expense, or by means of placards posted in the cars, if the matter is of comparatively small importance. Many disputed points can be settled and much misunderstanding prevented or overcome by a frank statement of the points leading up to the controversy, prepared in a manner that the public will understand. Any statement in print should be prepared by some publicity or advertising man whose experience in dealing with the public through the medium of printer's ink qualifies him for the work. An inexperienced man attempting this work can do much more harm than good.

Start a Public Relations Department

IF a railway company has no distinct department for the improvement of public relations, such a work should be organized at once, in order to carry on a distinct policy of publicity and educational work, without which the steps of progress are beset with many dangers. The organization of such a department depends, of course, on the size of the company, the make-up of its official staff, and the scope of the work called for by the local situation. In many cases the general manager can serve as a chairman of a committee, each member of which is selected to perform certain duties and report at regular meetings. Whether this work is handled by a committee or by an individual, it will depend upon the policy of the campaign and the manner in which it is formulated and given to the public as to its effect and permanent results. In any event, the deeper and broader study of cause and

effect, and the careful analysis of the entire situation, will doubtless produce new information and sound bases to work from, even among companies where considerable effort has already been made.

Suggestion for Car Cards

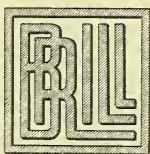
ARRANGE for a holder to take a card as large as a regular car ad to be placed in a conspicuous place in every car. Print on both sides of the card, and if the holder permits both sides to be seen, so much the better, if not, the card will be ready to be reversed, and in either case change every week or two. Plain "upper and lower case" type should be used, and from 50 to 100 words can be easily read. These cards can carry short messages, such as the following: Besides collecting fares and running the car, the conductor and motorman are expected to do everything possible for your safety and convenience. A recent talk to conductors and motormen will be printed in the advertising section of Saturday's newspapers. If you will read it carefully, you will gain a clearer understanding of the duties and service rendered by these men, and will therefore be able to better co-operate with them to mutual advantage.

The Brill Advertising

DURING the month of August The J. G. Brill Company's advertising in the technical publications will cover a variety of the Company's products. Snow sweepers and plows will be the subject of the series in the *Electric Railway Journal*. Each weekly advertisement will cover a different feature of the apparatus under discussion and, as usual, will involve a change of illustration. The Brill Half-Ball Brake Hanger will be covered in the *Street Railway Bulletin* advertising, while that in *Electric Traction* will deal with steel cars. The custom of handling the illustrations in the various publications in a different manner will be continued.

Changes of Address

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



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Brill Stationary-Back Seat

WHILE this seat weighs only thirty-five pounds, no strength has been sacrificed in the construction. Pressed-steel one-piece pedestal, back and cushion support as shown in the illustration, and no cross frames, account for the reduction of weight.

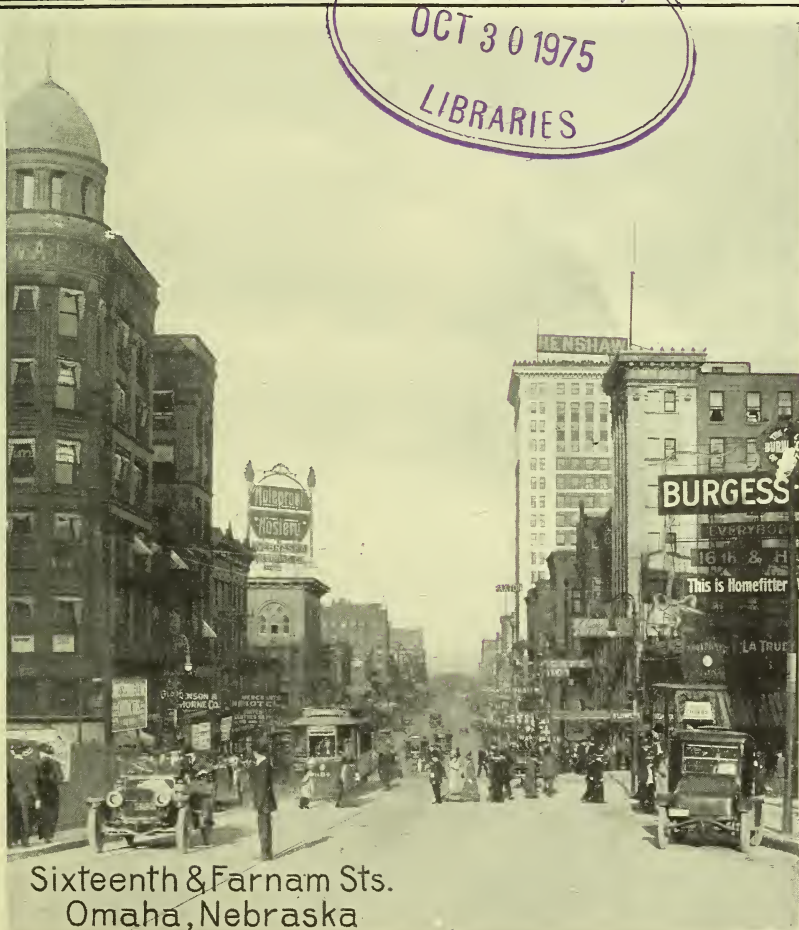
THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA

BRILL MAGAZINE

SMITHSONIAN

OCT 30 1975

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Omaha, Nebraska

The October Convention Exhibit

THE BRILL EXHIBIT at the Railway-Appliance Exposition held in connection with the American Electric Railway Association Convention at the Million Dollar Pier, Atlantic City, October 12-16, will be conspicuously located at the left of the Main Building, near main entrance, as in former years.

The latest types of Radiax and double-motor pivotal trucks will be shown, and a number of new developments in car seats and other equipment are worthy of thorough investigation. The Exhibit Committee's plans for the Exposition are remarkably complete and forward as usual, assuring a comprehensive and attractive representation of the advances made in all classes of electric railway equipment during the present year. The adequate and attractive reception arrangements of the Brill Exhibit Spaces are welcome to all.

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA



Leonard T. Busby.

PRESIDENT, CHICAGO SURFACE LINES

Conscientiousness

Somewhere in the make-up of every man is a faculty intended to serve as an automatic controller of conduct, setting it in motion, regulating it, and holding it in check.

This faculty is known by several names—conscience, moral instinct, ethical perception—each meaning the same impelling, compelling, repelling force, to be used or not, according as a man wills.

It is the factor in a man's life having most to do with the development of what is beneath the surface—his character—and also of what is seen or known of him—his reputation.

The conscientious man is under his own imperative command and obligation to do what is right, to resist what is wrong, and is thereby fitted to command and control others.

Conscientiousness at the head of an organization, permeates to and through every department and individual, engendering and securing high standards of conduct.


Conscientiousness is the prime qualification necessary to the establishment of confidence, and is more and more recognized as a power and not a weakness in the character of men who deal with the public.

Conscientiousness in dealing with the public produces a public conscience—a spirit of fairness—resulting in confidence and co-operation.

September 15, 1914

Copyright, 1914, by The J. G. Brill Company, Philadelphia, Pa.

Leonard A. Busby

EONARD A. BUSBY, President of the recently organized Chicago Surface Lines, was born in Jewett, Ohio, 1869. He was educated in public schools, and in 1894 graduated from Ohio Wesleyan University (first honor man); graduated from Northwestern University Law School in June, 1895, and began his professional career as a law clerk in the offices of Lyman & Jackson the same year. Three years later Mr. Busby became a member of the firm and continued the general practice of law until 1906, when he became counsel for the receiver of the Calumet Electric Street Railway Company, Chicago. In 1908 he was appointed counsel for the Calumet & South Chicago Railway Company, and in 1910 counsel for the Chicago City Railway Company and the various lines controlled by the Chicago City and Connecting Railways Collateral Trust. During the year 1913 he conducted the negotiations with the City of Chicago for an operating merger of all of the surface lines in the city. The result of these negotiations was embodied in the so-called "Unification Ordinance," passed by the City Council November 13, 1913, and made effective February 1, 1914. The new organization, embracing all of the surface street railways in the City of Chicago, is known as the "Chicago Surface Lines," of which Mr. Busby was elected President in January and assumed his duties as the chief executive February 1, 1914. He is a member of the Chicago Club, Mid-Day Club, and the Law Club of the City of Chicago, and is one of the trustees of the John Crerar Library.

Conditions Which Govern the Type of Car for City Service

Omaha, Nebraska

THE wide brown waters of the Missouri River form the eastern boundary of the State of Nebraska, and extends in a northwesterly direction for a distance of over 300 miles. Nearly halfway up the boundary is the city of Omaha, the metropolis of the State, and directly opposite, connected by bridges, is the city of Council Bluffs, in the State of Iowa. The land which formed the original town site of Omaha is an elongated and elevated river terrace now given over entirely to business; behind this are hills and bluffs over which the residential districts have extended. From a population in 1880 of 30,500, it has today 135,000, which, with the population of South Omaha of 35,000, that of Council Bluffs of 35,000, and about 10,000 in several suburbs, gives the lines of the Omaha & Council Bluffs Street Railway Company a tributary population of about 225,000.

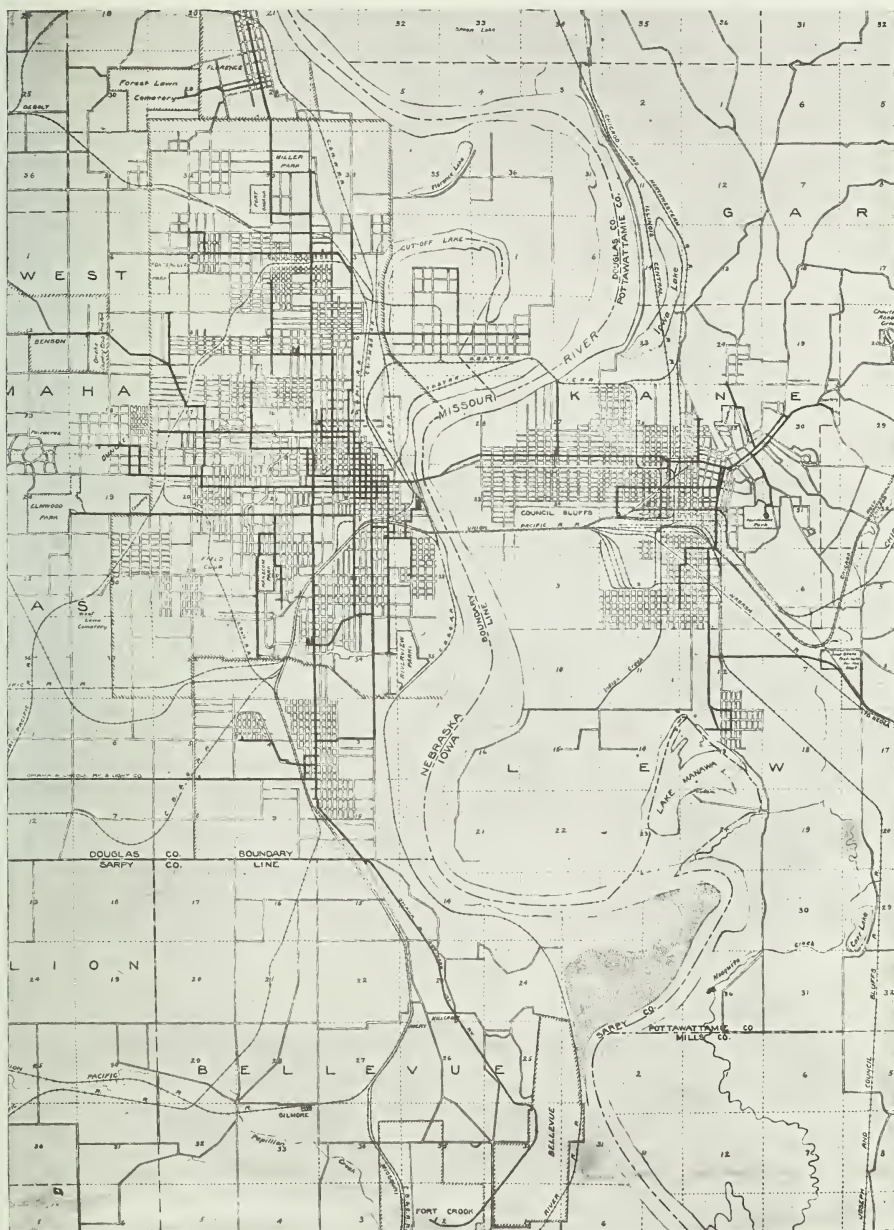
Omaha, which was named from the Omaha Indians, passed through various vicissitudes from 1825, when it was a licensed Indian post, to 1857, when it received its charter as a city. Till 1867, it was the capital of the territory, and since 1887 it has been the only city in the state governed under

the general charter for metropolitan cities. Its location and business activity secured the city large freighting interests and gave it an initial start over the other cities of the state. Three great railway systems entered the city in the years 1867-8, and today Omaha has outlets over nine grand trunk railways—the Chicago, Burlington & Quincy, the Union Pacific, the Chicago, Rock Island & Pacific, the Chicago Great-Western, the Chicago & Northwestern, the Chicago, Milwaukee & St. Paul, the Illinois Central, the Missouri Pacific and the Wabash.

While the meat packing industry began as early as 1871, and became an important factor in the business growth of Omaha, it was greatly advanced by the removal of the Union stockyards in 1884 to what is now South Omaha. Among its principal manufacturing establishments are breweries and distilleries, silver and lead smelting and refining works, railway shops, flour and grist mills and dairies.

One of the most successful expositions ever held in this country was the Trans-Mississippi Exposition, illustrating the progress and resources of the states west of the Mississippi, held here in 1898.

Omaha is well provided with



OMAHA TRAFFIC CONDITIONS AND CARS. Map showing the lines of the Omaha & Council Bluffs Street Railway Company on both sides of the Missouri River. Note the loop system at the business centre, which provides unusual routing facilities for single-end-operated cars.

educational institutions, including a university, departments of State University, a state school for the deaf, several colleges and high schools and a public library. It also has a number of hospitals, and many churches and other religious and philanthropic institutions. Among its newspapers are several

struck by a tornado which wrought havoc diagonally across a residential part of the city for a distance of five miles and several blocks wide. Although heavy rains followed the tornado and ended with a snowstorm, the railway company cleared the wreckage on the lines in the track of



OMAHA TRAFFIC CONDITIONS AND CARS. Intersection of 24th and Cumings Streets, an important transfer point on the system.

of wide influence throughout the west. The city is the headquarters of the United States Military Department of the Missouri. At Fort Omaha, near the northern city line, there is a signal corps and a station for experiments with war balloons. Fort Crook is a large infantry post 10 miles south of the city.

In March, 1913, Omaha was

the tornado in remarkably short time and escaped with a comparatively small replacement expense.

The street railway system of Omaha had its beginning in a two-mile horse-car line in 1867, and developed slowly and through many difficulties through 30 years of its history. Several systems which had come into existence were eventually consolidated, and the

lines were electrified during the period of 1893-6. Not until the year of the Trans-Mississippi Exposition, 1898, did the lines yield a fair income, and in 1902 a stable condition of affairs was secured through the consolidation of the Omaha and Council Bluffs Bridge lines, which brought the present

the old cars replaced with large double-truck equipment. Among the later buildings is a double-deck carhouse of reinforced concrete construction which has a capacity of 85 cars and includes spacious trainmen's quarters and offices. This building was completed about two years ago.



OMAHA TRAFFIC CONDITIONS AND CARS. Fourteenth and Douglass Streets

organization, The Omaha & Council Bluffs Street Railway Company, into existence. In the following years a new central power station and new sub-stations were built, large carhouses and shops were erected, a considerable number of lines double-tracked and many extensions made, heavier rails of the girder type were installed, the overhead rebuilt, and

All the lines in the cities of Omaha and Council Bluffs are owned or controlled by the Omaha & Council Bluffs Street Railway Company, and consist of 160 miles of standard gage track, 29 miles of which are single-track, and $65\frac{1}{2}$ miles are double-track. The radius of the shortest curve is 35 feet. The Omaha & Southern Interurban Railway, which connects



OMAHA TRAFFIC CONDITIONS AND CARS. Twenty-fourth Street and Ames Avenue.



OMAHA TRAFFIC CONDITIONS AND CARS. Burlington Street, with Union Depot on the right.

South Omaha, Bellevue, and Fort Crook, is under the same management. The layout of the lines in the two cities is shown in the accompanying map, and it is interesting to note the regularity of the street arrangement and the comprehensive scheme of the railway system in spite of the hilly

maximum grade being as steep as 12 per cent.; the streets, however, are wide and fair speeds are attainable on many parts of all lines outside the business area. Double-trucks and four-motor equipments are therefore used under cars operated on divisions of the railway system having the heavier



OMAHA TRAFFIC CONDITIONS AND CARS. The Stock Exchange Building in South Omaha; the Union Stock Yards are nearby.

character of the land. A very adequate loop system in the business section permits the use of single-end-operated cars, and the terminals of all lines are provided with wyes, with a few exceptions where loops are installed. Many of the grades are severe, and range from 5 to 10 per cent., the

grades and single-motor trucks with two motors per car on the other lines.

For the normal daily service of the lines, 260 cars are required, and there are 350 cars available for maximum daily service during the rush-hour periods, which occur between 6.30 and 8.00 A. M., and

5.00 and 6.15 P. M. Of these 350 cars, 138 are of the type illustrated, which is the latest standard of the system. Some of the cars in operation are similar to the standard type, but have longitudinal seats and are mounted on an older type of single-motor

During the year 1913, 55,030,638 revenue passengers were carried and 16,739,701 transfer passengers; the car mileage for the year was 10,134,108.

The standard type of car on the lines has been carefully developed and is the outgrowth of former



OMAHA TRAFFIC CONDITIONS AND CARS. Both rear doors slide into pockets in narrow bulkhead. Seating capacity, 38

truck; there are also a number of steel trail cars operated on certain of the lines during the peak load periods. At Sixteenth and Farnam Streets, in the heart of the business district, cars pass at the rate of 60 per hour during the heavy traffic periods. The prepayment method of fare collection is used and transfers are issued.

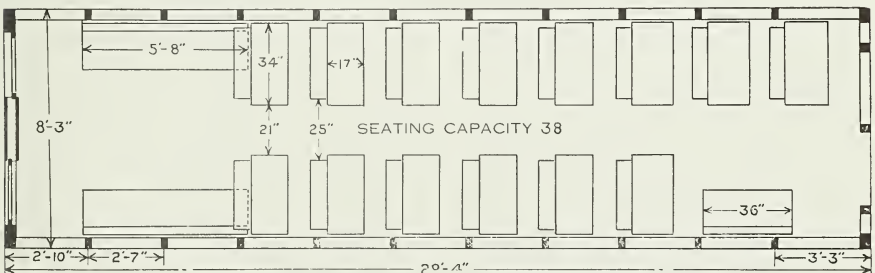
equipment. The prepayment method of fare collection was first put in operation on the system in 1909, and is provided for in the latest type of cars by a 6-ft. 8-in. rear platform, having a pipe railing extending from a stanchion, at the center of the 5-ft. 5-in. step, around to the far side of the narrow central bulkhead. The position



OMAHA TRAFFIC CONDITIONS AND CARS. Standard car of the system. Mounted on Brill No. 27-GE1 trucks having wheel base of 4 ft. 6 in.

of the conductor and fare box is within this railing, back of the bulkhead; the bulkhead serves as a pocket for the sliding entrance and exit doors at each side. This platform is vestibuled and is enclosed on the devil-strip side, but is not provided with doors at the step. The diagram below shows the seating plan for 38 passengers, and gives the general dimensions of the body. At the front

end, the platform is 5 ft. long, and has a 3-ft. 0 $\frac{1}{2}$ -in. step. The exit from the carbody to the front platform is not provided with a door, as the heater is located on this platform. Two-leaf folding doors, operated from the motorman's position by a simple lever system, are hinged at either side and open outwardly; the stationary step is covered by inclined guards attached to the lower part of the doors.



OMAHA TRAFFIC CONDITIONS AND CARS. Height, track to side sills, 2 ft. 8 $\frac{1}{2}$ in.; side sills over trolley boards, 9 ft. 1 $\frac{1}{2}$ in.; floor to centre of headlining, 8 ft.; track to step, 16 $\frac{1}{2}$ in.; step to platform, 13 $\frac{1}{4}$ in.; platform to floor, 10 in. Weight of body, less equipment, 18,200 lb.; air and electric equipment, 2,600 lb.

Step heights at front and rear platforms are, $16\frac{1}{2}$ in. from rail to top of tread, from tread to platform $13\frac{3}{4}$ in., from platform to carfloor 10 in. All the windows in the body and platforms have stationary upper sashes and lower sashes arranged to drop into covered pockets; cherry is used for the interior finish of the car and for sashes and doors. Other details, such as the lighting arrangement, ventilating, route and destination signs, etc., are clearly shown in the engravings.

The car bodies are built on wooden underframes, having 5 by 6-in. side sills and $3\frac{1}{2}$ by $5\frac{7}{8}$ -in. crossings. The side sills are reinforced by 8 by $5\frac{5}{8}$ -in. outside plates and have an additional reinforcement consisting of angles at the bolsters extending to the corner posts and to similar distance from the bolster toward the center of the car. Inside truss rods

are anchored through the end sills and raised to the height of 1 ft. 6 in. on the second side post, where they are brought over strong steel supports, thus giving substantial reinforcement to the overhang; the centers of the sills are braced by $1\frac{1}{8}$ -in. truss rods, with $10\frac{1}{2}$ -in. queen posts. Tie rods, $1\frac{1}{4}$ by $\frac{1}{4}$ in., extend through the corner posts along each side under the belt rail; the side posts are $2\frac{3}{8}$ in. thick, and the corner posts, $4\frac{1}{4}$. The platforms at both ends are supported on Z-bar outside knees and angles at the center.

The standard trucks of the lines are the Brill 27-GE1 type of double-motor truck, and the Brill 39-E type of single-motor truck. Both types of truck have a wheel base of 4 ft. 6 in.; the double-motor truck is equipped with motors of 32 hp. capacity and the single-motor truck of 35 and 40 hp. capacity.

Equipment for New Bus Line in Birmingham, Alabama

One-Man Prepayment Operation

THE Birmingham Realty Company, of Birmingham, Ala., a few months ago purchased four 15-ft. 6-in. omnibus bodies from The J. G. Brill Company as a means of increasing the transportation facilities to their Norwood property, a highly developed residential section situated about three and

one-quarter miles from the center of the city. During the short period the busses have been in operation they have given complete satisfaction to the company and have become very popular with patrons on account of affording quick, clean and noiseless transportation; the route traversed is over asphalt streets.

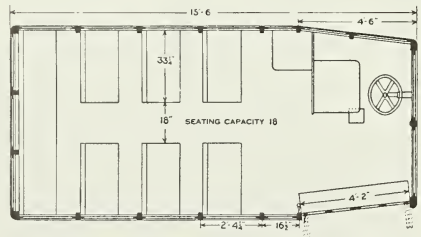
The operation of the busses is



OMNIBUSES FOR BIRMINGHAM, ALA. The stanchion at the center of the doorway separates colored and white passengers in entering and leaving. Mounted on two-ton Pierce-Arrow Chassis.

on the one-man prepayment method. The 4-ft. 2-in. door opening on the forward right-hand side is the only means of entrance and exit. This is rather large, considering the size of the body, but it is necessary, owing to a State ordinance which prohibits white and colored persons entering and leaving a public conveyance through one and the same opening, although there is nothing to prohibit them sitting together if they desire. Therefore, the door opening is divided by a pipe stanchion extending from the top step to the top panel, and each class uses its separate door opening for both entrance and exit. The door opening is enclosed by two manually operated double-leaf folding doors, which close in conjunction with the single folding step. In addition to operating the doors, the driver also attends to the collection of

fares, with the aid of a fare-box located beside his seat, as shown in the above illustration. The roof is the standard plain-arch type, and is equipped with two ventilators, one at each end, located in the top panel. There are also two windows in the front end, the one directly in front of the driver being provided with a stationary weather shield. The sashes throughout are of the two-part type, the upper being sta-



OMNIBUSES FOR BIRMINGHAM, ALA. Height, street to side sill, 2 ft. 9 1/2 in.; sill over roof boards, 6 ft. 11 1/2 in.; floor to ceiling, 6 ft. 9 in.; street to step, 14 1/2 in.; step to platform, 10 in.; platform to floor 10 in. Weight of body, including equipment, 2,600 lb.; weight of chassis, 5,600 lb.

tionary and the lower arranged to raise. The interior is finished in ash, natural finish, with bronze metal trimmings; the ceiling has a carline finish with roof boards showing. Transverse seats, three on each side, are of the Brill stationary back type with $33\frac{1}{4}$ -in. cushions; there is a single seat against the driver's partition, and a full-width seat at the rear end; all these seats are upholstered in Brill twill-woven rattan, and provide a seating capacity of 18, which is the number for this size and weight of body. The driver's seat is upholstered in leather. The two-ton Pierce-Arrow chassis has a wheel base of 15 ft., and the wheels are

36 in. in diameter. The body weighs 2,600 lbs., and the chassis 5,600 lbs.

The underframe is of Brill standard construction and built entirely of ash. The side sills are $2\frac{1}{4}$ by 4 in.; the front end sill $1\frac{3}{4}$ by 4 in.; the rear end sill $1\frac{3}{4}$ by $5\frac{1}{2}$ in.; there are three cross-ings $1\frac{3}{8}$ by 3 in., and four $1\frac{3}{8}$ by $1\frac{3}{4}$ in.; the latter attached to 3-in. channels form furring to which the floor boards are attached.

The corner and side posts in the upper framing are also of ash, $3\frac{1}{2}$ by $1\frac{1}{2}$ in., respectively. The entire construction and equipment are modern, and the busses present an excellent appearance.



OMNIBUSES FOR BIRMINGHAM, ALA. Natural ash finish. Lower sashes raise and upper are stationary.

Steam Cars for South American Railway

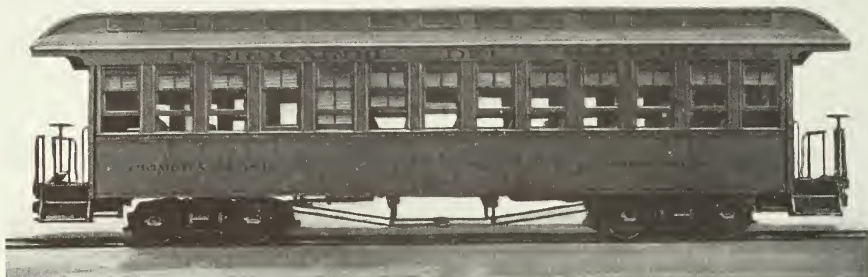
First- and Third-Class Passenger Service

AMONG the latest for-
 eign shipments of the
 Wason Manufacturing
 Company is a lot of
 cars of the types illus-
 trated, for the Ferrocarril del Pa-
 cifico, of Colombia. This railroad
 is of recent construction and is one
 of the most important in the Re-
 public, as it provides the only rail-
 way connection between the capi-
 tal, Bogota, and the coast. The
 western terminus of the line is
 Buena Ventura, the chief city of
 the west coast of Colombia, on
 Choca Bay, about four hundred
 miles south of Panama. Three
 rugged and high mountain ranges,
 the Cordillera, extend north and
 south throughout this part of the
 country; Bogota is situated on the
 western slope of the eastern range.
 From Bogota to Girardot, on the
 Magdalena River, a distance of
 about 75 miles, the company's
 trains use the tracks of the Colom-
 bian National Railway. In cross-
 ing the central Cordillera, a height
 of over 5,000 feet is reached, after
 which the line extends for a con-
 siderable distance through the
 Cauca Valley at a height of over
 3,000 feet, and then descends a
 long gradient to the coast. From
 Bogota to Buena Ventura, the dis-
 tance, which in a straight line is
 about three hundred miles, by rail
 is 362 miles. Rich gold and cop-
 per mining districts are reached

by the line, and there are excellent
 shipping facilities from the large
 harbor at Buena Ventura.

Both first and third-class cars
 are built on the same type of un-
 derframe, which is made up of
 7-in. channel side sills, center sills
 of 7-in. I-beams, and intermediate
 sills of 6-in. I-beams. The center
 and intermediate sills extend
 through to the platform end
 piece and the side sills connect
 with the body end sills. There
 are four 4-in. channel cross
 braces, which are riveted to all
 sills. Needle beams are riveted to
 the sills with $\frac{1}{4}$ -in. gusset plates.
 These needle beams are made of
 6-in. I-beams. Built up bolsters
 are employed, the top member be-
 ing 8 by $\frac{7}{8}$ in., and the bottom
 member 8 by 1 in.; the plates are
 machined and accurately fitted.
 Truss rods of wrought iron $1\frac{1}{4}$ in.
 in diameter, with ends upset to
 $1\frac{1}{2}$ in., reinforce the side sills.

The side construction of both
 types of cars is the same, and con-
 sists of two diagonal braces be-
 tween each pair of posts, the
 braces being secured at the top by
 hook bolts, which are brought
 through the side sills and have nuts
 and washers for tightening if re-
 quired. This relieves the belt rail-
 ing of strain and furnishes a con-
 venient means of tightening joints
 which may be affected by the ex-
 tremes of climate encountered on



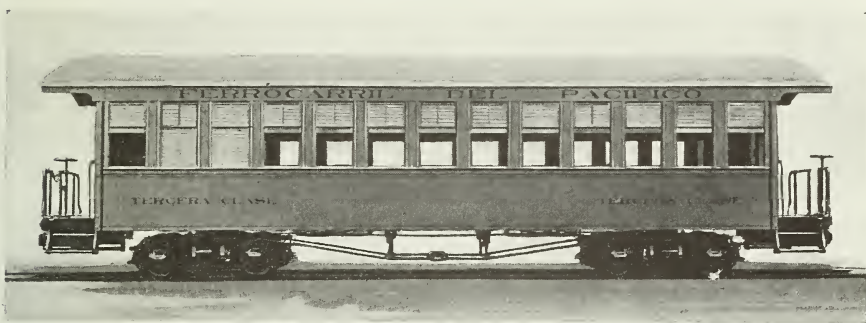
STEAM CARS FOR SOUTH AMERICAN RAILROAD. First-class type. Mounted on Wason Trucks of standard design. Built for 3 ft. gage track.

the lines. Tie rods are also furnished at each post, extending through both top plate and side sill. The roofs differ, in that the first-class cars have the monitor

type and the third-class have the plain arch. The interior of the first-class cars is of clear red oak throughout, and the ceiling is of composition board; the doors and



STEAM CARS FOR SOUTH AMERICAN RAILROAD. Interior of first-class type. Red oak finish throughout. Toilet compartment located at each end.



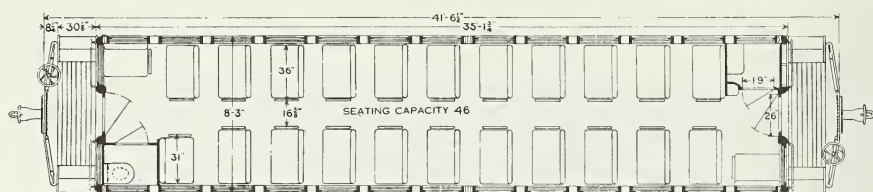
STEAM CARS FOR SOUTH AMERICAN RAILROAD. Third-class type. Mounted on Wason Trucks of standard design.

sashes are also of red oak. Twill-woven cane upholstered seats, 36 in. long, and having 19-in. backs, furnish a seating capacity of 46. Toilet rooms are provided at each

end. The third-class cars have carline finished ceilings, and the interior woodwork is sheathed in pine and with ash doors and windows. Wooden slat seats are used

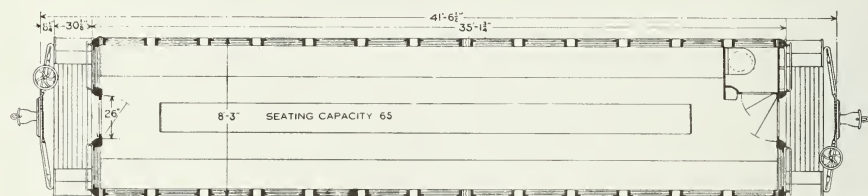


STEAM CARS FOR SOUTH AMERICAN RAILROAD. Interior of third-class type. The three benches provide a seating capacity of 65.



STEAM CARS FOR SOUTH AMERICAN RAILROAD. Seating plan of first-class type. Height, track to side sills, 2 ft. 3 3/4 in.; side sills over roof, 9 ft. 8 1/2 in.; floor to center of headlining, 8 ft. 7 7/8 in.; track to step, 15 11-16 in.; risers, 10 in.; platform to floor, 1 9-16 in.; weight of body, 21,400 lb.; trucks, 11,500 lbs.

with a central bench without back; for this size of car; they have a the seating capacity is 65. Two wheelbase of 5 ft., 26-in. diameter double center lamps, designed to wheels, 3 3/4 by 7-in. journals, and

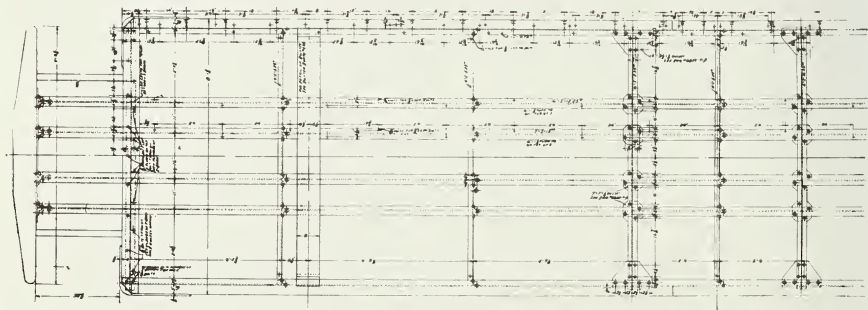


STEAM CARS FOR SOUTH AMERICAN RAILROAD. Seating plan of third-class type. Height, track to side sills, 2 ft. 3 3/4 in.; side sills over roof, 9 ft. 2 3/4 in.; floor to center of headlining, 8 ft. 2 7-16 in.; track to step, 15 11-16 in.; risers, 10 in.; platform to floor, 1 9-16 in.; weight of body, 20,000 lbs.; trucks, 11,500 lb.

burn kerosene, are used for both types of cars.

Both types are mounted on Wason trucks of standard design

are made for a track gage of 3 ft., which is the standard of the system, and which is common to many lines in South America.



STEAM CARS FOR SOUTH AMERICAN RAILROAD. Design of composite bottomframe used for both first- and third-class cars.

A point to be considered in ordering baggage and freight cars is that, in many instances, a power hoist could be utilized to great advantage as part of the equipment.

New Standard Type of Car Adopted for Salt Lake City

DURING the last two years there has been great activity in electric railway extension and improvement in and around Salt Lake City. The Utah Light & Railway Company controls and operates the street car lines of the city and also lines reaching important towns to the north and south. The rapid growth of Salt Lake City, which has now about 100,000 population, and the immense development of its environs, have been constantly calling for a greater carrying capacity on these lines and the extension of trackage to certain towns and sections where the tributary population is large. In preparation for the operation of longer lines and a greater number of cars on existing lines, a large extension was made to the central power station two years ago, and the peak load capacity of its hydro-electric stations was increased by the construction of equalizing reservoirs. These equalizing reservoirs enabled the company to impound sufficient water to increase its peak load power capacity 50 per cent. without interfering with the continuity of the flow below the stations, required for irrigation purposes. In addition to the furnishing of current for its lines, the company controls practically all of the electric lighting business of the city.

The car illustrated is one of 24 recently put in operation on the lines, and built by the American Car Company. Utmost care in every detail was exercised in the planning of this type, as it has been adopted as the new standard of the railway system, from which it is believed there will be no reason to depart for a considerable period. The wide streets of Salt Lake City permit the operation of a car as long as this (50 ft. over bumpers) and ample prepayment platforms adapt it to heavy traffic; also, the large seating capacity is desirable for the long suburban lines. Weight is reduced by a steel bottom and side construction, in which wide side girders carry the load.

Some of the cars have been placed on the "First South Line," one of the busiest divisions of the system, and extends for about 5½ miles. This line has a grade from 1 to 5 per cent for two-thirds of its length. A number are in operation on the "Second South Line," also a busy line with frequent stops, and is 8½ miles long with a similar grade to the "First South Line." Six cars are equipped with powerful motors for the faster speed required on the "Wandamere Line." This line is 5½ miles long and outside the city has stop signs 1000 ft. apart.

The side girder construction consists of 1/8-in. cold rolled patent-

level steel with joints covered both inside and out with $\frac{1}{8}$ -in. splice plates. The upper member of the girder is a 4-in. special bar section weighing 6.7 lb. per foot, and the lower member is a 4 by 4 by $\frac{3}{8}$ to 7-16-in. tee; both top and bottom members extend the full length of

system of diagonal bars (shown in the diagram on page 276) resist deflection from cornerwise strains. A wide $\frac{1}{4}$ -in. steel gusset plate reinforces the center of the end sills and provides an attachment for the center platform knees. The bolsters are cast steel $9\frac{1}{2}$ in. deep at



NEW STANDARD TYPE FOR SALT LAKE CITY. Omission of bulkheads an important factor in weight reduction.

the body. Two steel angles, 2 by $1\frac{1}{2}$ by 3-16 in., are riveted to the side girder plates at each post, to which the posts are bolted. These angles are forged at right angles at the lower end to permit riveting to the stem of the tee. Wide vertical as well as horizontal forged gusset plates secure the 10-in. end sills to the side girder tee, and a

the center. The platforms are supported on side knees of 6-in. channel section weighing 13 lbs. per foot and reinforced at the end sill by 2 by 2 by $\frac{1}{2}$ -in. top and bottom angles. The diagonal platform braces and other members of platform and body not described are shown in the diagram.

Straight-grained ash is used for

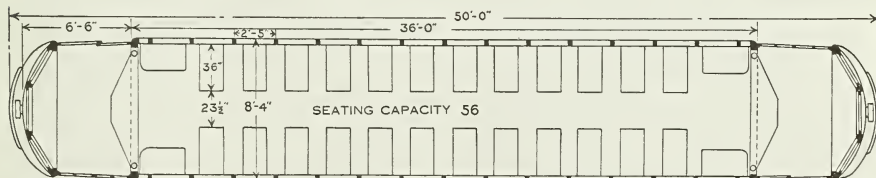


NEW STANDARD TYPE FOR SALT LAKE CITY. Doors on both sides are operated by lever on platform and open outwardly. Mounted on Brill No. 27-G Trucks.

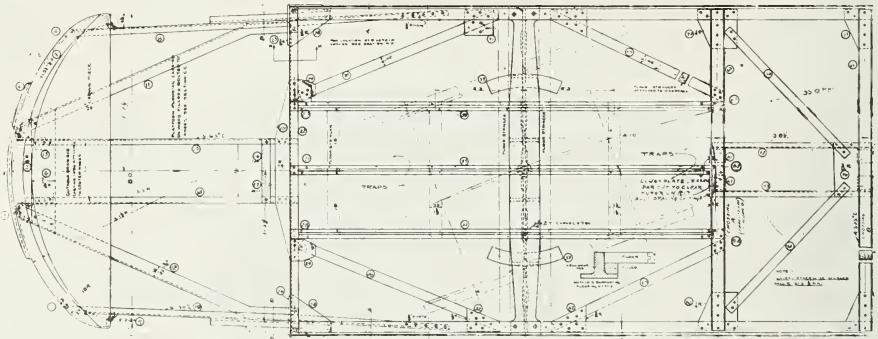
the side posts, which are spaced 2 ft. 5 in. from center to center. The side panel framing consists of two longitudinal members between posts, and the framing piece is set in the posts which are grooved to receive it. The belt rail and framing piece are braced by four ash ribs between each pair of posts, boxed into the belt rail and mortised into the framing piece. A drawn-steel moulding serves for the window sill capping and extends the full length of the car; it is fitted around and flashed to the posts with copper. At the corner posts, and at each alternate side post, are steel carlines, composed of 1 by 1 by $\frac{1}{8}$ -in. angles for the top member, and 3 by $\frac{1}{8}$ -in. plates. A steel carline, $1\frac{1}{2}$ by $\frac{3}{8}$

in., with wood furring on each side, reinforces each hood across the center.

The entrance and exit platform opening is provided with two-leaf doors, glazed in both upper and lower panels, and operated in conjunction with the step by a double-shaft outward-folding device. At the motorman's right-hand side a two-leaf exit door is operated by a single-shaft outward-folding device, to which the step is connected. White enamelled $1\frac{1}{4}$ -in. pipe is used for the six stanchions—four on the platform, and one at each body corner post—shown in the photograph of the interior; in this photograph will also be seen the $\frac{1}{2}$ -in. rod which supports the motorman's curtain. At the center of



NEW STANDARD TYPE FOR SALT LAKE CITY. Height from track to side sills, 2 ft. 10 9-16 in.; side sills over trolley boards, 8 ft. 10 11-16 in.; floor to center of headlining, 7 ft. 8 in.; track to step, 16 in.; step to platform, 13 in.; platform to floor, 11 in.



NEW STANDARD TYPE FOR SALT LAKE CITY. Plan view of steel bottomframe.

the vestibule is a single-sash window, arranged to drop into a pocket; the windows on each side have stationary upper sashes and lower sashes which drop. The side windows of the car have stationary upper sashes and lower sashes which raise their full height. Five-rod window guards are made in three sections to each side. The inside finish, panels, doors, sash,

etc., are of cherry, with mouldings of sanitary finish. Eight ventilators are installed in the car-body ceiling and one in each hood. The lighting arrangement consists of nine lamps on each side of the car, two along the center of the ceiling, two on each platform, one sign light, and one headlight on each platform, making a total of 28 lights per car.

Steel Combination Cars for the Cumberland & Westernport Lines

Brill No. 27-MCB2X Trucks

THE Cumberland & Westernport Electric Railway is a 27-mile line tributary to Cumberland, and traversing Allegheny County in a south-westerly direction from that city to Westernport, in the southwestern corner of the county on the Potomac River opposite Piedmont, W. Va. The line runs through the fertile and populous George's Creek valley, lying between ranges

of the Allegheny Mountains. The Allegheny Mountains cross this western part of the State of Maryland, dividing it into valleys rich in farm lands and bordered by forests of valuable timber and thickly dotted on the mountain sides with coal mines, and also clay and lime beds, which are worked principally for the production of cement, and for the manufacture of brick, terra-cotta, pottery, etc. The company's cars use the tracks

of the Cumberland Electric Railway from the center of the city to a suburb where its own tracks start and continue up a long grade, passing large coal mining interests, and on to Frostburg, 2,200 feet above sea level. A number of thriving mining towns are along the road, and all the way to Westernport—one and one-half hour's ride—the scenery is magnificent and well worth the trip.

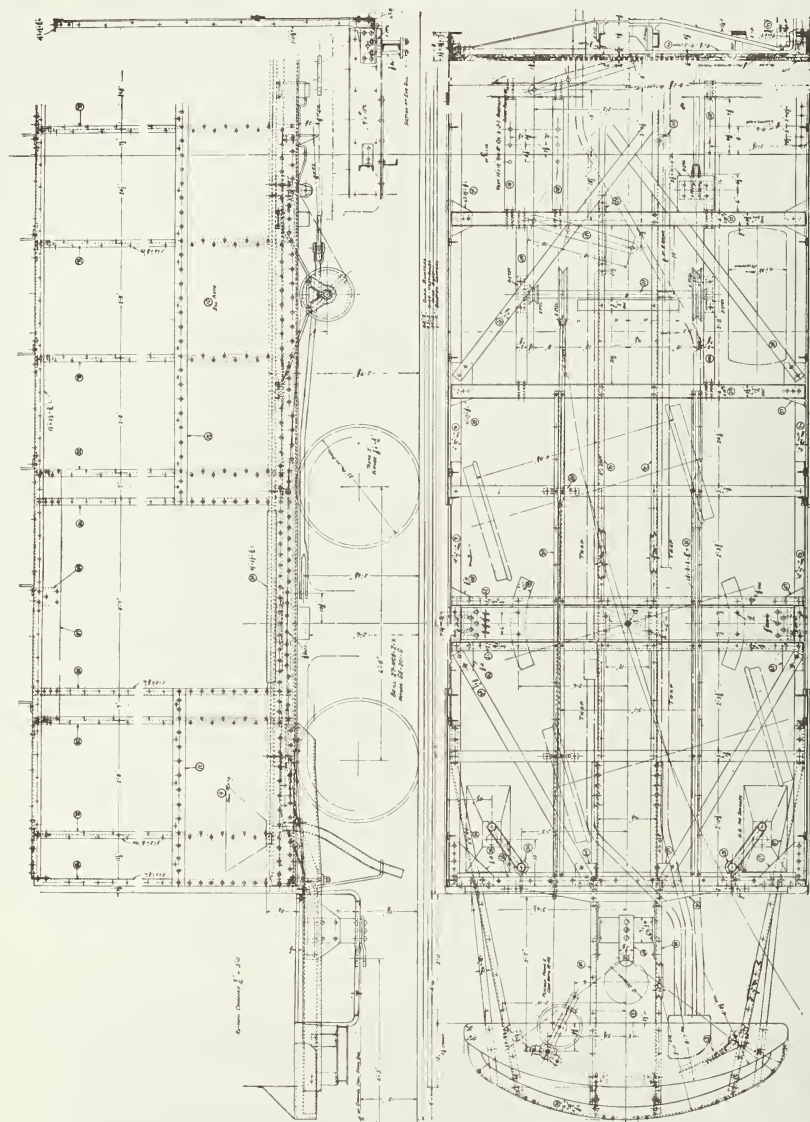
The J. G. Brill Company has lately delivered a number of cars of the type illustrated, which are admirably adopted to the requirements of this interurban system. The excellent track and roadbed of the line enable high speeds to be attained; therefore, the cars are mounted on Brill No. 27-MCB2X trucks, capable of 50 miles per hour. The side girders of the cars are made of 3-16-in. steel plate, reinforced at the bottom by 6 by 3½ by ½-in. angle, and at the top by 3½ by ½-in. bar; 10-in. channel steel is used for the end sills and 4-in. channel for the center stringers and crossings. The outside and

center platform knees are also of 4-in. channel. The diagram on page 278 shows the diagonal bracing at the center of the car and the wide gusset plates at the corners. Built-up bolsters are used, consisting of a top member of 9 by 5¼-in. plate, and a bottom plate of 9 by 7⅞-in. steel. Side posts of steel tee section are riveted to the side plates and to the metal top plate. The rest of the upper structure is of straight-grained ash, with the roof sills and other long members of long-leaf yellow pine. Steel rafters at each post, provided with ash furring strips, and one intermediate ash carline between each pair of posts, support the roof.

The vestibules are of the semi-circular closed type, 4 ft. 6 in. over the sheathing, and fitted with three drop-sash windows. At each side the door opening is provided with the builder's standard type of folding door and stationary step. The passenger compartment windows have stationary upper sashes and lower sashes arranged to raise



COMBINATION CARS FOR CUMBERLAND & WESTERNPORT. Steel girder and tee post construction. Mounted on Brill No. 27-MCB2X Trucks.



COMBINATION CARS FOR CUMBERLAND & WESTERNPORT. Length of body, 34 ft. 3 in.; over vestibules, 43 ft. 3 in.; of platforms, 4 ft. 6 in.; baggage compartment, 8 ft. 11 15-16 in.; passenger compartment, 24 ft. 2 9-16 in.; width over sides, 8 ft. 5 in.; aisle width, 21 in.; height, track to side sills, 2 ft. 9 3/4 in.; side sills over trolley boards, 9 ft. 2 1/4 in.; track to step, 17 1/2 in.; step to platform, 16 in.; platform to floor, 8 1/4 in.; weight of body, including electric and air equipment, 27,000 lbs.; trucks, 14,900 lbs.

their full height. Seven-rod win- side, afford protection when the
dow guards, in two sections to each sashes are raised. This compart-

ment seats 36 passengers, 14 of the seats being transverse, and longitudinal seats for four passengers each at the end next the platform. In the baggage compartment, the sliding doors on each side are four feet wide, and the glass in the upper part is protected by iron rods. Stationary longitudinal seats with

giving a total seating capacity for the car of 48.

Cherry is used for the interior finish and for the doors and sashes. Electric push buttons are installed in each window post in the passenger compartment and one on each platform. Among the Brill specialties with which the cars are



COMBINATION CARS FOR CUMBERLAND & WESTERNPORT. Sliding doors are 4 ft. wide. Seats accommodate 12 passengers; main compartment seats 36.

spring rattan cushions occupy the space between the door and the car corner on each side, and seat three passengers each; slat benches, which fold against the partition, fill the space in back of the sliding doors, and seat three passengers on each side: the seating capacity of this compartment is therefore 12,

equipped are radial drawbars, angle-iron bumpers, platform gongs, signal bells and door-operating mechanisms. The Brill No. 27-MCB2X trucks have a wheel-base of 6 ft. 4 in.; 33-in. diameter wheels; $4\frac{1}{4}$ by 8-in. journals, and are equipped with 60 hp. motors, four to a car.

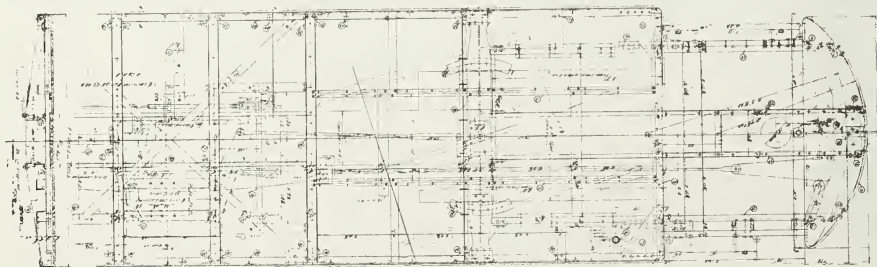
Steel Cars for Altoona & Logan Valley Electric Railway

City and Suburban Types

AN interesting lot of steel cars recently shipped by The J. G. Brill Company to the Altoona & Logan Valley Electric Railway Company, Altoona, Pa., consisted of five 28-ft. prepayment city cars, mounted on Brill No. 39-E single-motor trucks, and four 32-ft. 6-in. prepayment cars, mounted on Brill No. 27-MCB1 high-speed trucks, for light interurban service. The Altoona & Logan Valley Electric Railway is controlled by the American Railways Company, Philadelphia, and operates the city systems as well as the connecting lines of Tyrone, Bellwood, Altoona and Hollidaysburg, in south central Pennsylvania. In addition to its own lines, the company also controls the Home Electric Light & Heating Company, Tyrone, Pa., the Logan Land Company and the

Lakemont Park Company. Its equipment consists of some 87 passenger motor cars and 28 cars of miscellaneous types, in addition to the cars recently purchased. Altoona is the largest of the four cities in which the company operates, having a population of 52,000, and the interurban division of the system extends in a northeasterly direction from this city through Bellwood to Tyrone, and in the opposite direction from Altoona to Hollidaysburg.

The construction of both the city and the suburban cars is practically along the same lines. The underframe of the suburban cars is illustrated by the diagram on page 283, and with the exception of the length of the members and the width of the steel girder plate extending along each side of the carbody, it is the same as the underframe used under the city



CARS FOR ALTOONA & LOGAN VALLEY. Diagram of suburban car bottomframe. Steel side girder, 31 in. wide and 3-16 in. thick, is spliced at the corner post but continues around to the bulkhead door post. The bottomframe of city cars is practically the same.



CARS FOR ALTOONA & LOGAN VALLEY. Suburban car equipped for prepayment method of fare collection. Mounted on Brill No. 27-MCB1 Trucks.

cars. The side sills are 5 by 3 by $\frac{3}{8}$ -in. angle riveted to the end sills, which are of the same dimensions; a steel girder, 31 in. wide and 3-16 in. thick, extends above the side sills; it is spliced at the corner post, but continues around to the bulkhead door post, being reinforced at the top by a continuous $3\frac{1}{2}$ by $\frac{5}{8}$ -in. bar. All crossings are of 4-in. $5\frac{1}{4}$ -lb. channels, and the diagonal braces are 3 by $\frac{3}{8}$ -in. steel bars. The platforms

are supported on 7-in. $9\frac{1}{4}$ -lb. channels, which extend back under the end sill to the body bolster; the two outer knees are reinforced by steel plates at the corner posts.

An important feature of the upper frame construction is the tee-post construction. The side posts consist of 2 by 2 by $\frac{1}{4}$ -in. tees, extending from side sill to side sill, thereby serving also as earlines; these posts are riveted to the steel girder plate and to the angle side



CARS FOR ALTOONA AND LOGAN VALLEY. City Car. Mounted on Brill No. 39-E Trucks. Upper sashes in both types framed in one piece.

sill on each side. White oak is used as post fillers, to which the interior finish is attached.

Both types of cars have 6-ft. platforms, arranged for prepayment operation with pipe railings and are equipped for double-end operation, each platform having an entrance and an exit side. En-

closed by a single two-leaf folding door operated from the motor-man's position. All doors are operated in conjunction with the folding step, and are paneled with wired glass. The vestibule sashes drop into pockets, and are arranged to be held at desired heights. All side sashes are in two



CARS FOR ALTOONA & LOGAN VALLEY. Suburban cars are combination type. Smoking compartment equipped with slat seats accommodating 12; main compartment seats 36.

trance is always by way of the rear platforms, the exit door on the opposite side being locked, and vice versa on the front platform. The entrance openings are enclosed with two double-leaf folding doors operated by a lever on the platform; the exit openings are en-

parts, the upper sashes being framed in one continuous piece from corner post to corner post, and the lower arranged to raise. Two independently operated doors are located in each body end bulkhead, both sliding in the same direction into either end wall

pocket as desired. The interiors of the cars are finished in mahogany, and push buttons are located on all side posts.

The suburban cars have a partition separating them into main and smoking compartments; they are built with the plain-arch type

the installation of a stove during the winter. The seats in the main compartment accommodate 36 passengers.

The city cars are equipped with plain arch roofs, but the hood at each end, as will be noted in the illustration, is not flush with the



CARS FOR ALTOONA AND LOGAN VALLEY. Omission of bulkheads in city cars reduces weight. Seating capacity, 44.

of roof. The smoking compartment occupies the space of three windows and has a 26-in. sliding door in the partition. Longitudinal mahogany slat seats on both sides of the compartment provide seating accommodations for 12; a section of one seat is removable for

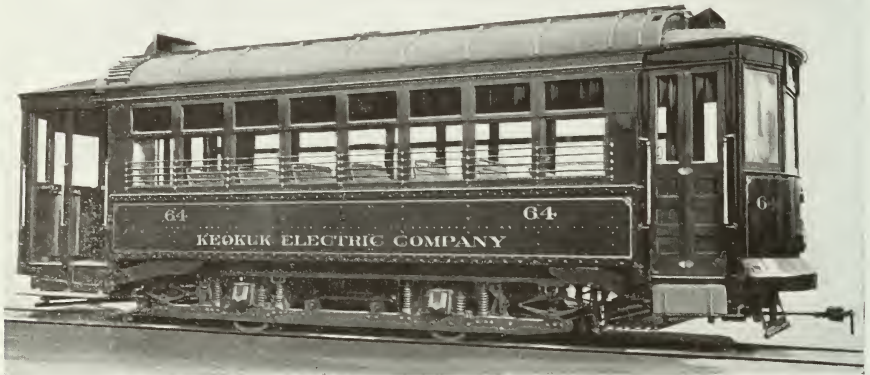
carbody roof, necessitating a transom which is equipped with a ventilator. Seven transverse seats of the mahogany slat type are located on each side of the aisle, and together, with the longitudinal corner seats at each end, provide a seating capacity of 44.

Single-Truck Type for Keokuk, Iowa

Steel Underframe

THE Keokuk Electric Company, which practically controls the electric railway, electric lighting, electric motor and the gas interests in the cities of Keokuk, Iowa, and Hamilton and Warsaw, Ills., besides

in two parts to a side and are made of 5-32-in. steel, with a 2½ by ¾-in. steel dropper bar at the top, and a 3½ by 2½ by ½-in. angle at the bottom. A 1¾ by ¾-in. oak member is bolted on top of the sill angle and mortised to receive the posts. The end sills are made

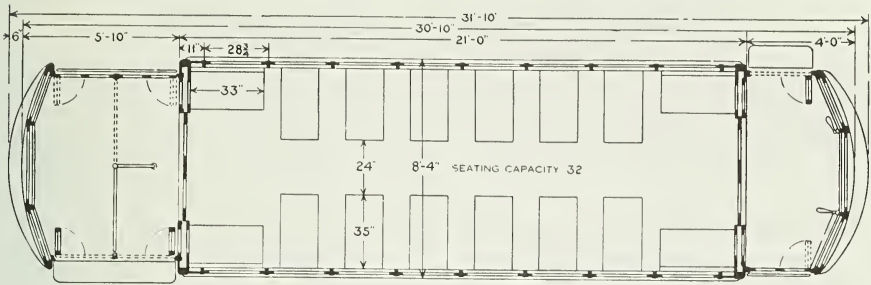


SINGLE-TRUCK TYPE FOR KEOKUK, IOWA. Rear platform arranged for prepayment method of fare collection. Upper sashes framed in one piece, extending from corner post to corner post.

operating an interurban line between these cities, recently purchased the type of car illustrated from the American Car Company. The city of Keokuk is situated in the extreme southeast corner of the State, having a population of some 14,000, and is situated on the Mississippi River.

This type of car is unusually interesting, as it includes the steel side girder construction rarely found in carbodies under 28 feet in length. The girder plates are

of angles, 6 by 5 by ¼ in., with 3½ by 10-in. oak bolted thereto. The cross sills are 5½-in. I-beams, gusseted to the sides by means of 3-16-in. steel. The truck sills are of yellow pine, reinforced by 3 by 3 by ¾-in. steel angles at the end sills. A substantial platform construction is used, which consists of 7 by 3½ by ¾-in. angle outside knees with reinforcing angles of 2 by 2½ by 5-16 in. and 42 in. long at the rear platform only. Other details of the bottomframe are

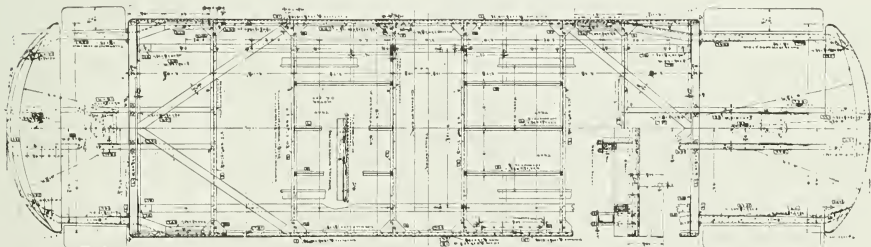


SINGLE-TRUCK TYPE FOR KEOKUK, IOWA. Height, track to side sills, 2 ft. 3½ in.; side sills over trolley boards, 8 ft. 7¼ in.; floor to center of headlining, 7 ft. 10 in.; track to step, 15½ in.; step to platform, 14 in.; platform to floor, 9 in.

shown on the accompanying diagram. The side posts are of light construction, with the upper windows framed with continuous members. The roof has the usual reinforcement of steel carlines.

While this type of car is designed for single-end operation chiefly, both platforms are equipped with controllers and brake arrangements and the seats have reversible backs. The platform at one end is 5 ft. 10 in. long, and is provided with a railing for separating incoming and outgoing passengers. The doors on each side of this platform are alike, and are of the two-leaf type, which fold inwardly at either side of the open-

ing. A stanchion is located at the center of the platform and the step is in one piece and hinged to fold up, but does not operate in conjunction with the doors. The platform at the other end is 4 ft. long and has no dividing railing. The doors at each side are of the two-leaf type and fold against the vestibule corner post; the steps at this end operate with the doors. Mutually operating sliding doors are at each end of the body. The lower window sashes raise to give a 26-in. clearance. Six transverse seats on each side, with corner seats for two passengers, have slat seats and backs, and furnish a total seating capacity of 32.



SINGLE-TRUCK TYPE FOR KEOKUK, IOWA. Diagram of interesting method of bottomframe construction. Includes steel side girders rarely found in cars of this length.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

When it is said of a railway employe that he is “always on the job,” it usually means a great deal more than that he has punctual and steady habits.

It is an expression that is commonly applied to a man who does his work extra well and is always alert in thought and action.

The man who is constantly thinking of what he is doing and watching what is coming next gets a reputation, has it said of him that he is a fellow who is “always on the job.”

Such a man never chafes under rules—he puts himself under much more strict rules than the company makes.

He doesn't need to straighten up and look busy when the boss comes around—he is always that way and the boss soon knows it.

He looks “professional” whatever his job is because his mind and his motions work freely and quickly together.

He quickly becomes a complete master of his work and then adds to his knowledge accurate information on everything relating to it.

While he has plenty of ambition, it is tempered with unflagging patience and perseverance and will therefore get him to his goal.

An added responsibility doesn't rattle him, for he is used to looking at his whole job as a big responsibility to be carried squarely on his own shoulders.

He is in training for the bigger responsibility that is coming his way when he is up to it, because he thinks, because he drives himself, because he is “always on the job.”

Some Newly Worded Warnings

FROM the time you start to leave the car till you reach the sidewalk never stop looking for danger.

Don't hesitate in front of a car, it confuses the motorman. Go forward or back in a decided manner.

When you stop to think be sure to stop in a safe place.

Get in and out of a car quickly, but don't hurry—hurrying is dangerous and sometimes fatal.

Don't let a child under eight cross a trolley car street alone.

If you don't warn and take care, your child may be maimed or killed, no matter how much we warn and take care.

Double your watchfulness when you cross a double-track street.

Selecting Employees

THE success of an electric railway company depends to a large extent on the fitness of its employees to their work. The selection of employees from the standpoint of fitness is therefore one of the important fundamentals of the whole organization. A man may be sound in mind and body, yet unsuited to the job for which he applies. To guard against misfits, a man should not be accepted on his good appearance and statements, nor even on a satisfactory recommendation, if it is at all possible to arrange for a sufficient trial to show whether he is actually experienced, or, if experience is unnecessary, to show whether he has aptitude. If enough thought and care are given to eliminating doubts of a man's fitness to a job before he is employed, much time, trouble and money will be saved and the organization will be strengthened by this process of exclusion.

Public Relations

IF the chief executive of an electric railway should publish his own public relations creed over his signature, giving it and similar statements ample and continued publicity, he would do more towards deepening the foundations of respect, confidence and co-operation than could be accomplished by all other publicity combined. The public realizes that the spirit which actuates the head of the company influences the entire organization. Real faith demands a dominating personality and the chief executive is the one to take the responsibility, commit himself frankly and fully to the highest standards of public service, live up to them and enforce them.

Car Card Talks to Passengers

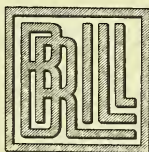
CONSIDER the motorman. It takes skill and experience to start and stop the car smoothly, to gage distances, to sound the warning gong at the right times, to hear signals no matter what is claiming the attention, to work in harmony with the conductor at all times, to watch the track for possible obstructions, to keep an eye on the trolley wire for a possible break, to sense what drivers of horses and quickly moving automobiles will do under various circumstances, to keep a sharp lookout for unexpected movements of children and adults at and between crossings, to be ready to warn or help thoughtless or preoccupied passengers entering or leaving at the front platform. Dim light, bad weather, and especially slippery rails, complicate things. Judgment and action must meet every situation without a second's hesitation—every trip has its series of more or less difficult situations. The weight of the car and its powerful motors give it great momentum, and, although controlled and guarded by the safest and most efficient means, it depends on the motorman and you to prevent an accident. A responsible man is running this car—only such are selected for such responsible work—you can rely on him to do his part.

Advertising in September Magazines

A CHANGE was made in the advertising program for August outlined in the last issue of BRILL MAGAZINE. Instead of a series on the subject of snow sweepers and plows in the *Electric Railway Journal*, the Radiax truck series of July was continued. Sweepers and plows will be featured this month, and will be followed by a series on trailer trucks. The Radiax truck will be shown in the September *Electric Traction*, and a snow sweeper in the *Street Railway Bulletin*. Special illustrations will be prepared for these issues as usual.

Changes of Address

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



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Brill Standard Snow Sweeper

THE Brill Standard Snow Sweeper has endurance and efficiency records in the cities of our Northern States, Canada and Northern Europe. It is built the same today as ten years ago. There has been no call to change any part—not a replacement order has been received in all this time for anything but the wear parts, such as sprocket wheels and sprocket chains. On heavy traffic lines like New York and Montreal, the machine has been used for years because it works fast and is dependable. Write for Catalogue No. 183.

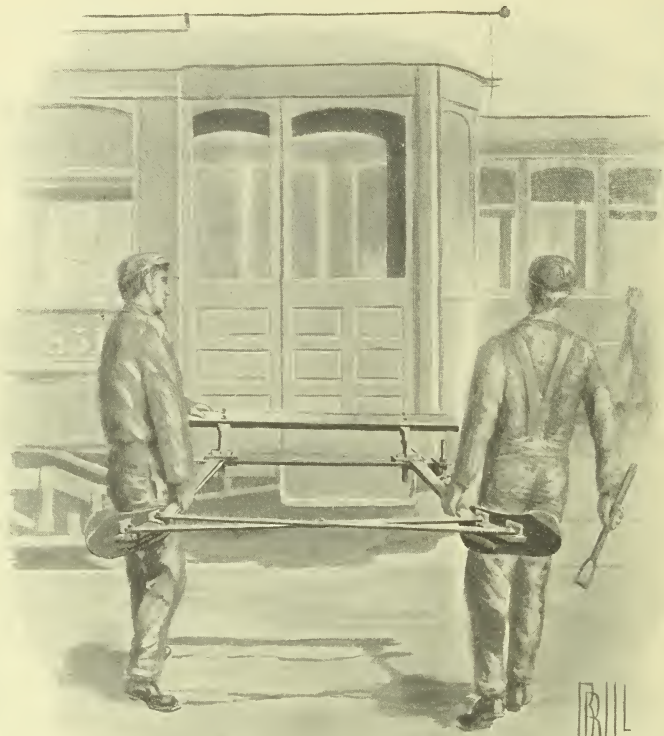
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PUT Brill Track Scrapers on your cars and you won't have to bring out the sweepers for light snows. During heavy storms they will keep the tracks clear after the plows and sweepers have been over. Strongly made, with no complicated parts to get out of order Ready for immediate shipment. Just give gage of track when ordering.



TIMOTHY S. WILLIAMS

PRESIDENT, BROOKLYN RAPID TRANSIT COMPANY

Constructiveness

Constructiveness is a faculty which should rank high in the estimate of a man's value.

Constructiveness should underlie all initiative, selection, co-ordination, co-operation, patience and force. It is the creative principle in thought and action forever working towards better and larger achievements.

While it is a mental instinct common to all, it is nearly dormant or more or less limited in the majority and well developed in comparatively few.

There are men in all walks of life who are clearly differentiated from their fellows by a capacity to obtain results, and in most cases this is due to their superior constructive faculty.

Those men who rise to places which demand unusual breadth of mind and force of character, have generally made their advance through their constructive ability.

The chief executive of a railway company, actuated by constructiveness, recognizes and desires this faculty in its higher development in those who co-operate with him, within and outside his organization, to ensure sound progress and lasting success.

Volume
Eight

Brill Magazine

Number
Ten

October 15, 1914

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Timothy S. Williams



TIMOTHY SHALER WILLIAMS, President of the Brooklyn Rapid Transit Company, was born in Ithaca, N. Y., August 1, 1862. He received a public school education and entered Cornell University, from which he graduated in 1884. Immediately after graduation he became a reporter with the *New York Commercial Advertiser*, and through his study of State politics was made Albany correspondent. Later he was recalled to New York to take up the duties of city editor, after which he became Washington correspondent and finally an editorial writer for his paper. He gave up journalism to become Secretary to Governor Hill of New York, and continued that office under Governor Flower. He entered the electric railway field in 1895, and became connected with the Brooklyn Rapid Transit Company, of which he was made Secretary and Treasurer on July 1st of that year. In 1901 he was elected Vice-President, and in 1911 was chosen President of the corporation. He is also President of the Transit Development Company, President of the Brooklyn Heights Railroad Company, and a director of other corporations. Mr. Williams is a member of the University, Cornell University, Psi Upsilon, and other clubs of New York.

Conditions Which Govern the Type of Car for City Service

Philadelphia, Pennsylvania

K NOWN the world over as the Cradle of American Liberty, Philadelphia, founded 231 years ago by William Penn with a territory of two square miles and 400 people, now occupies 129½ square miles (82,933 acres), with a population exceeding 1,600,000, and is in many respects the most unique municipality in the United States.

Historically, from a standpoint of national and international interest, Philadelphia, the City of Brotherly Love, is the most important of the big American settlements. It was here that the founders of the Republic dared to declare independence of foreign domination, throw off the yoke of British sovereignty and "proclaim liberty throughout all the land unto all the inhabitants thereof."

This "Mother City of America" was the first capital of the United States, the first to mint the coin of the new republic, the first to establish a corporate banking institution, the first to inaugurate a stock exchange, the first to navigate a vessel by steam, the first to build steam locomotives, the first to have a navy yard, the first to encourage printing and journalism, the first to publicly and extensively engage in all of the peace-

ful pursuits of the various sciences, higher and lower education, industry and philanthropy.

Having been the first to assume the belligerent task of divorcing America from European control and government, Philadelphia has been the foremost of the cities of the "New World" in inaugurating, encouraging and fostering those things which make for general progress, peace and happiness. The "mother" has seen two of her "children," New York and Chicago, produce larger families (their separate populations exceeding hers), but she has maintained and continually expanded her pristine supremacy as a manufacturing centre and a home city. Considered from the standpoint of the average number of wage-earners and the average capital invested in each industry, Philadelphia is the greatest workshop in the world. In the production of steam locomotives, street railway cars, iron and steel ships, knit goods, carpets and rugs, leather, saws, felt hats, upholstery goods and oilcloth, Philadelphia is unequalled by any other city in America. She excels all except one other city in foundry and machine-shop products, sugar refining, petroleum refining, worsted goods, chemicals, druggists' preparations,



PHILADELPHIA TRAFFIC CONDITIONS AND CARS. The lines of the Philadelphia Rapid Transit Company comprise 664 miles of track, covering the entire area of the city. One of the lines running outside the boundaries reaches a point 13 miles from City Hall

dyeing and finishing textiles, cordage, twine and fertilizers. Philadelphia products are universally known for their character and intrinsic value.

Philadelphia is and always has been pre-eminently a city of homes, individual family domiciles. Few of its people are huddled to-

Town" idea to a great extent having been emphasized in the city building, is still dominant among its plans for future development. There are 350,000 separate dwellings in Philadelphia for her 1,600,000 population. As shown by the recent United States Census, the population per dwelling in



PHILADELPHIA TRAFFIC CONDITIONS AND CARS. Market Street shipping district, looking eastward towards Delaware River and Camden. Near-Side cars seen entering and leaving the loop, established to avoid former dangerous decline to sharp curve at foot of hill

gether in tenements, and not many seek the apartment house plan of living. There is no other large city in the world having so many homes per capita of population, spread out over a wider area. No other city in America has so many large parks and squares—5,000 acres of “breathing places” for its people—Penn’s “Green Country

Philadelphia was 5.2 persons, compared with 8.9 in Chicago, 11.1 in Brooklyn, 7.9 in Boston and 26.5 in New York. This innate tendency of Philadelphians to have individual homes, the great majority of them of modern construction, 85 per cent. of them housing but one family, less than 20,000 of the 350,000 dwellings being more than

three stories high, is responsible for the large area of land occupied per capita of population.

Philadelphia's population density, only 18.6 persons per acre, is the smallest of any of the large cities, New York, Brooklyn, Chicago and Boston. Thus it is shown that there is an increase in the

Philadelphia and the County of Philadelphia were consolidated and made co-extensive, there had been 28 independent forms of government within the county, the population showing a disposition to form separate units, bearing such names as Germantown, Kensington, Frankford, Southwark, etc.,



PHILADELPHIA TRAFFIC CONDITIONS AND CARS. Market Street at Fifteenth, with west side of City Hall in the background and Broad Street Station of the Pennsylvania Railroad to left of illustration. One of the busiest traffic intersections, combining railway, surface and subway lines as its tributaries

length of journey because of the spreading out of the population, and the appeal of the suburbs to Philadelphians has caused many large communities of its former residents to spring up of recent years within twenty miles of the city.

Until 1854, when the city of

sectional designations still applied to those localities of the present municipality.

The principal business district of the city lies between the Delaware River, on the east, and the Schuylkill River, on the west, both furnishing excellent water front shipping facilities, connected by a belt

line railroad under city control, and with navigable advantages direct to the sea by way of the Delaware River channel and Delaware Bay, the channel being under constant improvement for depth and width by the Federal Government. Within the business district are located the big office buildings, the large banks, trust and insurance companies, the great wholesale and retail stores—the city's heart of trade—and the section which constantly attracts the visitor from far and near to such historic and nation-treasured places as Independence Hall with its Liberty Bell, Congress Hall, Independence Square, Carpenters Hall and the Betsy Ross House, where the first American flag was made. The manufacturing industries are scattered, established to the north, northeast, south and southwest of the business district. To and from the business district, the streets, for the most part, run parallel, and not unlike many other old American and European cities, a number of them are narrow, accommodating only a single track car system. This condition, particularly as it dominates much of the traffic to and from the business center, had long been the cause of the congestion of the street railway lines until they were taken under the Stotesbury management, formed by Mr. E. T. Stotesbury, the noted financier, in response to public appeal for betterments three years ago. Under the Stotesbury management of the Philadelphia Rapid Transit Company,

with Mr. T. E. Mitten, formerly of Chicago and Buffalo, as chairman of the Executive Committee in charge of carrying out the improvements, the car lines have been comprehensively and scientifically rerouted. Many betterments to the property have been effected, the motormen and conductors' wages have been increased 7 cents an hour through a co-operative plan, which has brought about contentment and interest of the employes in their work, and a new type of car has been introduced to solve the transportation problems of the entire city. This is known as the Near-Side car, built by The J. G. Brill Company. It is a Philadelphia standard type by sanction of the people, who were given opportunity by the Stotesbury management to vote approval or disapproval of the new equipment and who almost unanimously expressed themselves in its favor.

As Philadelphia grew and expanded in the old horse-car days, many independent and sectional street transportation lines were established. These were more or less unified by the introduction of the cable and later of electricity as the motive power, and in 1902 were consolidated under lease into a single operating system, the Philadelphia Rapid Transit Company. Since the consolidation, which gave opportunity for a more comprehensive development of the various lines and the inauguration of additional facilities, a subway-elevated system, running east and west, seven and one-third miles in length,

has been constructed. The subway, which operates east of the Schuylkill River, penetrates the business district, underlying Market Street, the principal trade thoroughfare, the underground tubes running to a point near the Delaware River, where the trains emerge upon an elevated structure to afford direct connection with the ferry lines eastward to Camden and other New Jersey points, and travel conveniences to the steamship piers on the same river. The elevated system runs westward from the Schuylkill River and is a continuous part of the subway. Philadelphians are thus brought by high-speed lines to the gateways of the world-



Market Street at Eighth, the "heart of the shopping district." The subway trains have stations leading directly into the stores

renowned New Jersey watering places — Atlantic City, Cape May, Ocean City and other noted resorts that summer millions from all over the United States and other countries.

The high-speed facilities connect with the three trunk lines, the Baltimore & Ohio Railroad, the Pennsylvania Railroad and the Philadelphia & Reading Railway, the two latter having their main Philadelphia terminals in the heart of the business district, while the Baltimore & Ohio's principal station is on the banks of the Schuylkill River at Twenty-fourth and Chestnut Streets, which is reached



Chestnut Street, looking eastward from Fifteenth, in the high office-building district

through a covered passageway by passengers from the subway-elevated. The connections of these trunk lines spread over the entire continent, and thus make Philadelphia part of the whole railroad facilities of the United States, not to mention through routes to Canada. The subway also has stations underground leading directly into Philadelphia's five mammoth department stores. The subway-elevated lines have done much to build up the western section of the city. The elevated system has a large terminal station at Sixty-ninth and Market Streets, where surface trolley lines enter from the suburban sections of three populous counties. A number of the surface lines from West Philadelphia speed into the business centre through the subway, a four-track system from the Schuylkill River to Juniper Street Station, just east of the City Hall. This station is the big beehive of underground traffic, and has been made additionally convenient and attractive by the Stotesbury management through the establishment of escalators to carry passengers to and from the lower surface-subway car level and the upper platforms of the through subway-elevated train stations at Thirteenth and Market Streets. At the Market Street elevated ferry stations also, the moving stairway relieves the passenger of the necessity of walking to the high speed system.

Covering, as they do, practically the entire area of 129½ square miles within the city limits, and

running outside of the boundaries to as distant points as Willow Grove Park, 13 miles from the city centre, the trolley cars can hardly be said to radiate from any given focus, though it is true that many of the principal lines are established to serve the traffic to and from the business district and find their turning points therein. The heaviest traffic is to and from the north and northwest, but south and west Philadelphia sections also have grown to proportions of transportation requirements only second to the demand of the more populous uptown zones. There are east and west, north and south lines that serve their purpose without touching the business centre, except by transfer to other lines. They are, however, together with several cross-town lines in West Philadelphia, a part of the whole extensive system of transportation, which is linked throughout the city.

The Philadelphia Rapid Transit Company has 439 miles of single track and 225 miles of double, or second track, system. Of the total trackage of 664 miles, about 40 miles of rails are used in the car houses, yards and sidings. The gauge of track is 5 ft. 2¼ in., the radius on the inside rail of the shortest curves being 33 ft. The city is practically level. The company operates 2,336 surface and 215 subway-elevated cars. They travel approximately 229,000 miles daily, or 4,000 miles further than nine times the distance around the world. The number of passengers



PHILADELPHIA TRAFFIC CONDITIONS AND CARS. Chestnut Street, between Fifth and Sixth Streets. Independence Hall, with its modest belfry, beneath which rests the historic "Liberty Bell" in its glass encasement. Curtis Publishing Company's building in background

carried each day, under normal conditions, ranges from 1,500,000 to over 2,000,000, when the cars are on the streets a daily average of about 26,500 hours. The morning rush hour period is from 6.30 to

8.30 o'clock, with the peak load between 7 and 8 o'clock in the travel towards the business district. On certain of the lines, there is also a morning peak between 8 and 9 o'clock, because of the travel of

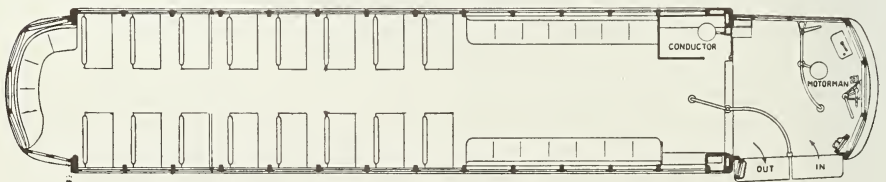


PHILADELPHIA TRAFFIC CONDITIONS AND CARS. Nearside type of car—the standard of the system—mounted on Brill 39-E Single-Motor Trucks. There are now 1500 Nearside cars in use on the lines, about $\frac{2}{3}$ of all cars operated

school children. The evening rush period is from 4.30 to 6.30 o'clock, with the peak between 5 and 6 o'clock. The heaviest rush is to and from the traffic centre, between the Delaware River and Seventeenth Street, about $1\frac{1}{2}$ mile, and Race and Locust Streets, about a half mile. The principal surface traffic points during the heaviest loading periods are at Thirteenth

and Market Streets, northbound, and Twelfth and Market Streets, southbound.

The system of fare collections has been generally improved by the Stotesbury management, which is educating the public to have the exact amount of fare ready so as to obviate traffic delay because of making change for passengers while others are waiting to board



PHILADELPHIA TRAFFIC CONDITIONS AND CARS. Seating capacity, 51. Emergency door with folding step at rear corner can be operated from motorman's position or by handle over door

a car. On all the Near-Side cars, there are stationary, upright fare boxes, developed and made by the Dayton Fare Recorder Co. They record the fare automatically when the conductor turns a crank. Into them the passenger deposits the

shown in the report for the fiscal year ended June 30, 1914, the number of passengers carried during the twelve months totaling 588,854,662, or six times the entire population of the United States. The revenue passengers totaled



PHILADELPHIA TRAFFIC CONDITIONS AND CARS. Brill Semi-Convertible windows slide entirely up into roof pockets. The upper sash of every alternate window opens inwardly to supply fresh air without direct draught on passengers. Signal buttons in all side posts

fare, the conductor merely having to make change for those unprepared with the right amount. Fare boxes of the same kind have been placed in the subway stations and have greatly facilitated the handling of crowds.

An idea of the extensive service of the Philadelphia system is

483,283,959, and the transfer passengers numbered 105,570,703 for the same period.

There are now 1,500 Near-Side cars in use in Philadelphia, this being two-thirds of all the cars operated in the city. The effective application of the Near-Side principle, together with the perfecting

of platform and seating arrangements, ventilating system, car route signs, life guard and other details for enhancing the public safety, health and convenience, as included in the standard Near-Side car, has been found to meet most satisfactorily the conditions which govern the Philadelphia service.

Safety of passengers has been the watchword in the development of the Near-Side car, with the result that accidents to passengers in getting on and off cars have been practically eliminated. The improved



PHILADELPHIA TRAFFIC CONDITIONS AND CARS. Conductor's position in carbody instead of on platform leaves ample space for incoming passengers, gives full view of car and enables street names to be heard more clearly

controlling devices, including air brakes and air sanding apparatus, have proved of great advantage in reducing the number of accidents.

The total number of accidents now occurring shows the astonishing decrease of over 25 per cent., as compared with the total accidents in the year immediately preceding the incoming of the Stotesbury management, although 14 per cent. more passengers are now carried,

The boarding and alighting of passengers take place directly under the eye of the motorman, who controls the entrance and exit doors. The



PHILADELPHIA TRAFFIC CONDITIONS AND CARS. Entrance and exit doors with their folding steps are opened and closed separately or together by a handle in front of the motorman. Passengers enter and leave under the eye of the motorman. Note the large destination and route signs

motorman is, therefore, given entire responsibility for the safety of passengers entering and leaving, and he is thus able to act promptly and safely in getting the car under way; this without the loss of time heretofore encountered, due to the necessity of waiting for the bell signal under former systems, in which the responsibility for safe boarding and alighting of passengers is divided between the motorman and conductor. The conductor is relieved of the responsibility of watching the entrance and exit steps and giving the "go-ahead" signal, and his duties are, therefore, now confined primarily to the collection of fares and the calling of streets.

A feature of this car is the ample space on the front platform available for incoming passengers who are waiting to deposit their fares. The conductor's position is at the forward end of the car just off the front platform, thus placing him in close touch with the whole car, so that he may look after the convenience of passengers.

In order that the Near-Side car may not only exceed the Health Department requirements as to ventilation, but to the end that this car will be the best ventilated car ever put into service, the manage-

ment has developed a method of ventilation based on foreign practice, wherein, by means of hinging the upper sash of every alternate window in the car, any desired supply of fresh air may be admitted without in any degree causing a direct draught upon the passengers.

The system of route numbers and destination signs on the perfected Near-Side car is a result of a thorough investigation of car sign systems in foreign and American cities. A large numeral on the front of the car identifies each line and can be seen readily at a distance. The destination towards which the car is moving is indicated immediately beneath the route number. The name of the line and the route number also are shown on both sides of the car in the panels forward of the first window. Within the car, along the arch at the forward end, a descriptive sign with large lettering shows the route number and the names of the streets traversed. Block numbers on the rear end of the car also identify the route.

Full details of the construction of the Near-Side car and its improvements were published in the BRILL MAGAZINE issues of June, 1911; May, 1912, and June, 1913.

Transit facilities are as necessary to the vigorous growth of a city as good blood is to the human body or plentiful money is to trade. In each case it is a circulatory system on which healthy life, growth and development depends.

New Equipment for Centerville, Albia & Southern Railway Company

High-Speed Trucks

THE American Car Company, a few weeks ago, shipped from its works in St. Louis two combination center-entrance passenger and baggage cars and one baggage and express car to the Centerville, Albia & Southern Railway Company, operating in the southern central part of Iowa. The distance between Centerville and Albia is about twenty miles, and the popu-

lation tributary to the lines is approximately 15,000. Both types of cars are mounted on Brill 27-MCB trucks, capable of a speed of 50 miles per hour.

The composite underframe of the passenger and baggage type, illustrated on page 304, represents a substantial method of construction for center-entrance cars, and is extremely modern. Side sills are made up of 4 by 7-in. yellow pine and 15 by $\frac{3}{8}$ -in. steel plate, rein-



CARS FOR C. A. & S. RAILWAY. Main compartment, looking toward the baggage compartment. Interior finish, mahogany. Lower sashes raise. Single swinging door in each bulkhead



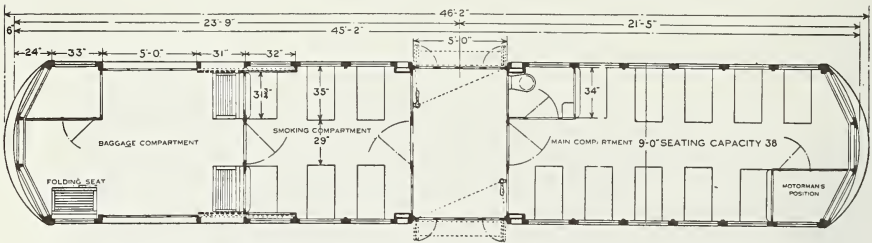
CARS FOR C., A. & S. RAILWAY. Doors and step controlled by lever on platform; see seating plan for location. Mounted on Brill 27-MCB1 Trucks

forced at the top with a $2\frac{1}{2}$ by $2\frac{1}{2}$ by $\frac{1}{4}$ -in. angle, and at the bottom with a 6 by $3\frac{1}{2}$ by $\frac{3}{8}$ -in. angle, and terminate at the center door posts. The drop-center platform is supported by a steel plate, 11 by $\frac{1}{2}$ in., securely riveted to the side sill plate and reinforced at the top with a $4\frac{1}{2}$ by $3\frac{1}{2}$ by $\frac{3}{8}$ -in. angle and at the bottom with a 6 by $3\frac{1}{2}$ by $\frac{3}{8}$ -in. angle. Under the baggage door on each side, the side

sill plate is but 11 in. wide, but its top reinforcement is increased, being 2 by 2 by $\frac{1}{2}$ -in. angle, and additional strength is obtained by a steel plate 6 ft. by 8 by $\frac{3}{8}$ in., riveted to the side sill plate. The center stringers extend from buffer to buffer, having a depression under the center platform, and are of 6-in. $12\frac{1}{4}$ -lb. I-beams; the cross-ings are of oak, 3 by 5 in., and the diagonal braces of 3 by 3 by $\frac{1}{4}$ -in.



CARS FOR C., A. & S. RAILWAY. Baggage and express type. Doors at diagonal corners permit entrance of material too long for admittance through side doors. Mounted on Brill 27-MCB2 Trucks

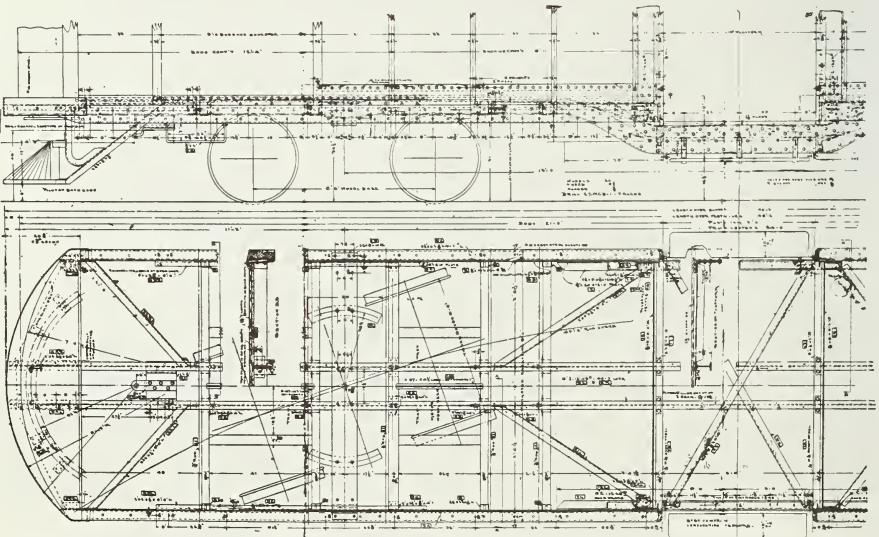


CARS FOR C. A. & S. RAILWAY. Height from track to side sills, 2 ft. 7 in.; side sills over trolley boards, 9 ft. 4 in.; floor to center of headlining, 8 ft. 1½ in.; track to step, 16½ in.; step to platform, 14½ in.; platform to floor, 10 in.; weight of carbody, including air and electrical equipment, approximately 21,500 lb.; weight of trucks, 16,000 lb.

angles. Ash center door and corner posts, 3¾ in. thick, and side posts, 2 in. thick, together with the center door framing, having top and side members of 9-in. 13¼-lb. channel, form the superstructure. The outside sheathing of the cars is No. 16-gage sheet steel.

Two-leaf folding doors, operated by a lever from the conductor's position in conjunction with the folding step, enclose the door

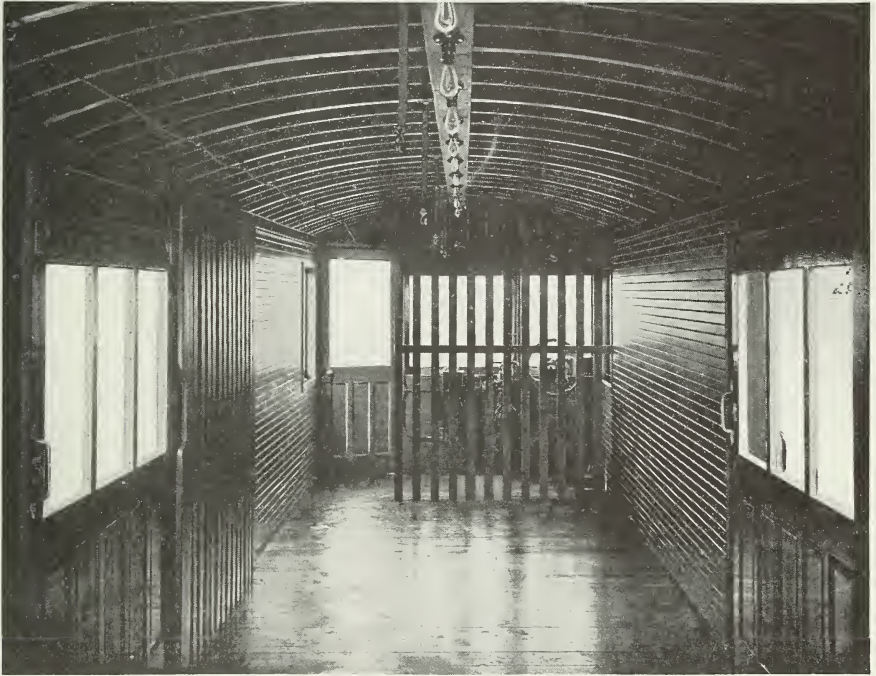
opening on each side of the car. A bulkhead on each side of the platform, containing single swinging door, separates the main and smoking compartment, and a similar bulkhead separates the smoking and baggage compartments. To the left of the entrance to the main compartment is a toilet room, with water cooler in alcove in wall. Eight transverse reversible-back and two stationary-back seats up-



CARS FOR C. A. & S. RAILWAY. Underframe of passenger and baggage type, showing reinforced steel side sill plate and 9-in. channel door frame at center entrance

holstered in green plush in the main passenger compartment and four reversible-back and two stationary-back seats upholstered with the same material in the smoking compartment provide seating accommodations for 32 passengers. This is increased to 38 when the

trance are in one continuous piece. The cars are for double-end operation, and are equipped with motor-man's compartment at diagonally opposite corners. The interiors are of mahogany natural finish. Brill patented specialties, such as "Dendenda" platform gongs, "Re-

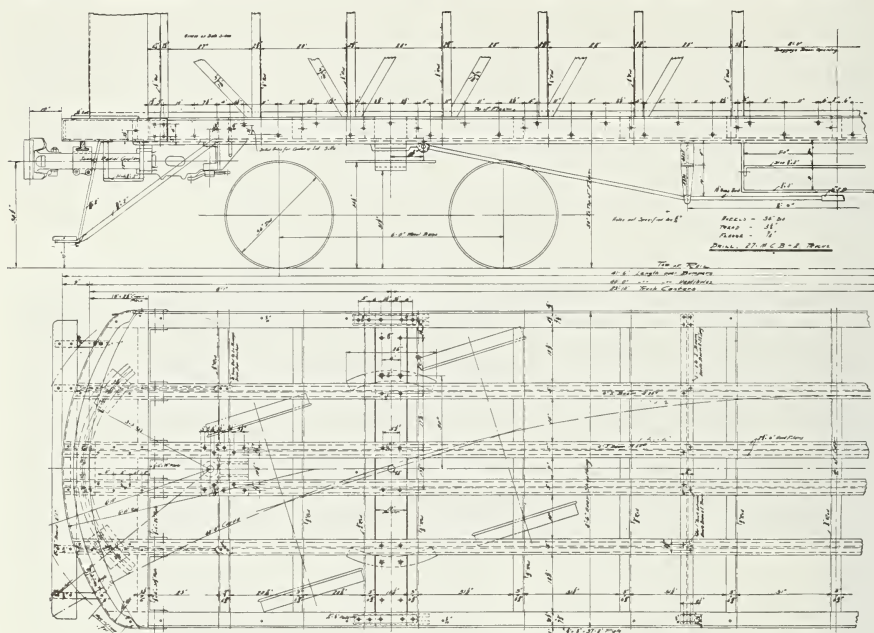


CARS FOR C., A. & S. RAILWAY. Interior of baggage type, finished in yellow pine, showing visible steel carlines in roof construction

three mahogany slat folding seats in the baggage compartment are used; one of the seats in the baggage compartment next the partition may be removed and a heater installed for winter use. All sashes are of two-part type, the upper being stationary and the lower arranged to raise; the upper sash frames on each side of center en-

triever" signal bells, angle-iron bumpers and channel-iron draw-bars are prominent among the equipment of these cars.

The underframe of the baggage car is also composite, the side sills being of yellow pine, $4\frac{1}{2}$ by $7\frac{3}{4}$ in., reinforced on the outside with an 8 by $\frac{3}{8}$ -in. steel side plate, and the center and intermediate cross-



CARS FOR C., A. & S. RAILWAY. Diagram showing underframe and side construction of baggage type. Diagonal bracing of yellow pine and $\frac{1}{2}$ -in. rods extending along each side post and bolted through the top plate and the side sills, greatly strengthen the superstructure

ings of 6-in. $12\frac{1}{4}$ -lb. I-beams with yellow pine fillers. All sills are continuous from buffer to buffer. Crossings are also of yellow pine, 3 by $6\frac{3}{4}$ in., and the end sills $31\frac{1}{2}$ by 6 in., reinforced on the inside by 6 by $\frac{1}{2}$ -in. steel. The posts in the upper framing are of ash, those at the corner being $4\frac{1}{4}$ in. thick and those on each side of the 5-ft. door opening $3\frac{3}{4}$ in. thick; the other side posts are $2\frac{3}{4}$ in. thick. Additional strength is added to the construction by $1\frac{3}{4}$ by 3-in. diagonal braces as shown in the diagram above, a sheet-iron sheathing extending up the door posts to the height of 3 ft., and a $\frac{1}{2}$ -in. rod extending up beside each side post and securely

bolted to the top plate and side sill of the underframe.

The roof of this car, as well as the passenger cars, is the Brill plain arch type, amply supported on steel carlines. In addition to the 5-ft. doors on each side for the entrance of material, at diagonal corners, there is a single swinging door which serves for an entrance for the motorman or as a means of loading material of a length not admitted through the side doors. The interior finish is of yellow pine, with steel carlines showing. The vestibule sashes are of the single type and drop into pockets, with the exception of the ones in the center of the vestibules, which are stationary.



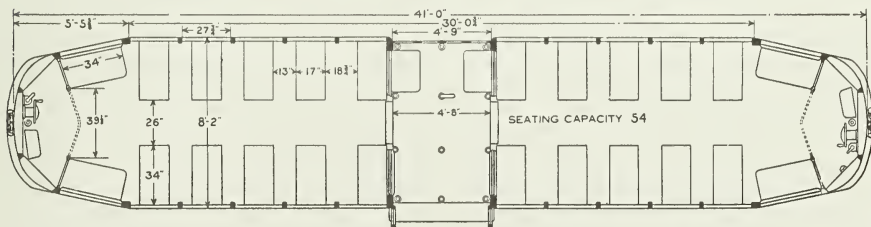
CENTER-ENTRANCE CARS FOR B. & W. Doors on one side of car are kept closed, and folding slat seats, shown on diagram below, are used. Mounted on Brill 59-E1 Trucks

Center-Entrance Cars for Buffalo Suburban Line

"Washington" Type

THE rapidly increasing passenger traffic and the consequent problem of quicker loading and unloading of passengers were important factors in a recent purchase of center entrance cars by the Buffalo & Willamsville Electric Railway Company. The cars illustrated are of the "Washington" type, and were

built by the G. C. Kuhlman Car Company. With the exception of their equipment and a few details of minor importance, they are identical to the original type furnished the Washington Railway & Electric Company about a year and a half ago by The J. G. Brill Company, which were illustrated and described in the February, 1913, issue of BRILL MAGAZINE. The Buf-



CENTER-ENTRANCE CARS FOR B. & W. Height from track to side sill, 2 ft. 6 1/2 in.; side sills over trolley boards, 9 ft. 3 1/8 in.; floor to center of headlining, 7 ft. 7 3/4 in.; track to step, 15 1/2 in.; step to platform, 13 1/2 in.; platform to floor, 10 in.; weight of body, including air and electrical equipment, 18,460 lb.; weight of trucks, 9500 lb.

falo & Williamsville Electric Railway Company, in addition to operating a six and one-half mile line between these two cities in southwestern New York, controls the lines in the city of Batavia now operating under the Batavia Traction Company and the projected

platform and consist of four $3\frac{7}{8}$ by $7\frac{3}{4}$ -in. pieces of yellow pine. The main supporting member under the center platform is a depressed 6-in. channel on each side, which extends from and to a point 3 ft. from the center door posts, where it is reinforced by a 10 by

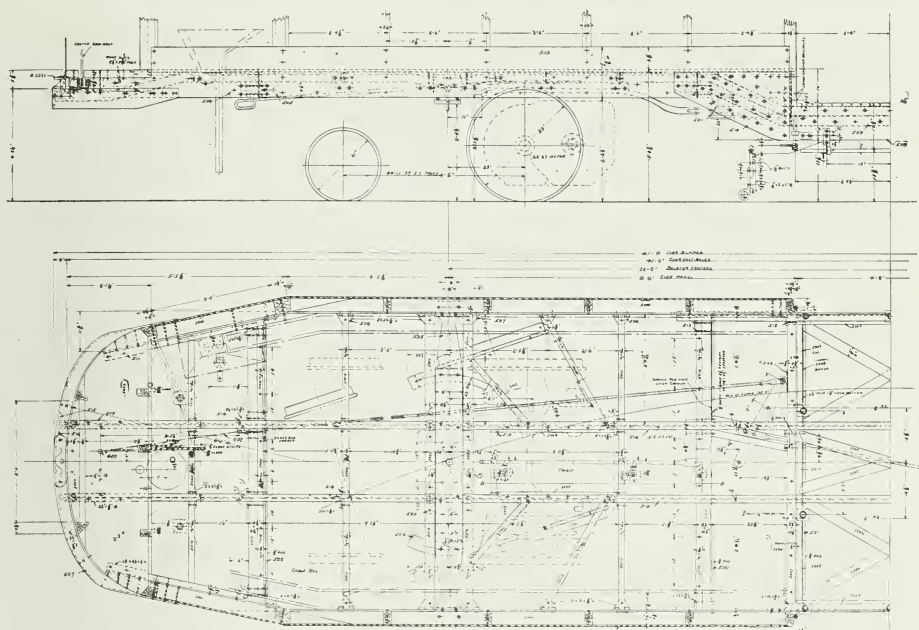


CENTER-ENTRANCE CARS FOR B. & W. Seats have reversible backs. Semi-convertible window system and 34-in. seats permit an aisle width of 26 in.

sixty-mile line of the Buffalo, Batavia & Rochester Railway.

The underframe construction of the new cars, which is composed of wood and commercial steel shapes in about equal proportions, may be termed rather unusual, in that the side sills extend from the center door post to the end sill on each side of the depressed center

$\frac{3}{8}$ -in. steel plate securely gusseted to the $1\frac{1}{2}$ by $\frac{3}{8}$ -in. steel side sill plate extending the length of each compartment along each side. The center stringers extend the full length of the car and consist of two 3-in. I-beams, with the same depression under the center platform as the side channel members. All cross members are of oak, the



CENTER-ENTRANCE CARS FOR B & W. Diagram of composite underframe, showing channel side sill construction under center platform

end sills being $2\frac{1}{2}$ by $10\frac{1}{8}$ in., crossings 3 by $4\frac{1}{2}$ in. and $1\frac{3}{4}$ by 3 in., and the diagonal braces 3 by 3 in. The body construction, where long leaf yellow pine and ash are used, consist of side posts $2\frac{1}{4}$ in. thick and center door posts $3\frac{1}{2}$ in. thick, with sheathing of No. 16 sheet steel extending from the side sills up to the belt rail.

The center platform, 4 ft. 8 in. wide, is equipped on each side with simultaneously operating double folding doors and step controlled by the conductor. Bulkheads are omitted, and a mahogany partition, which extends up to the level of the seat backs on each side of the center aisle, separates the center platform from the seating compartments. Four single mahogany seats are hinged to these low par-

titions, two of which may be lowered when the doors on that side of the car are closed and entrance and exit of passengers effected through the doors on the opposite side. All transverse seats have reversible backs, with the exception of those adjacent to the center platform, and are of the Brill "Winner" type. The semi-convertible window system with two-part sashes, with weather-proof hinged joints, which disappear into roof pockets permit an aisle width of 26 in., and together with the rear motorman's compartment, separated from the passengers by a pipe stanchion, which may be raised, provide ample standing room during heavy traffic periods. The trucks are the latest type of Brill Single-motor No. 39-E1 type.

All-Steel Cars for Trenton, Bristol & Philadelphia Street Railway

Brill Single-Motor Trucks

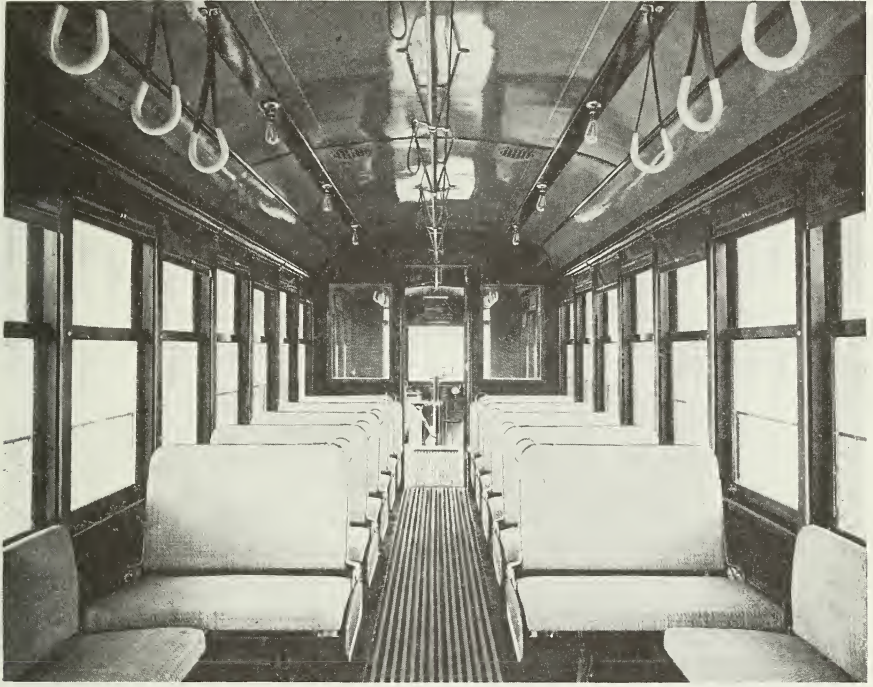
FIVE all-steel cars of the type illustrated, mounted on Brill single-motor trucks 39-E, constituted an order built a few months ago by The J. G. Brill Company for the Trenton, Bristol & Philadelphia Street Railway. The lines of this company comprise a trackage of 18 miles, beginning at Morrisville, on the Pennsylvania side of the Delaware River, and extending southwest, following the course of the river through Tullytown, Bristol, Bridgewater, Eddington, Cornwells and Andalusia to the City Line at Torresdale, and in addition the company has an agreement whereby it operates its cars over the tracks of the Frankford, Tacony & Holmesburg Street Rail-

way to Bridge Street, Frankford, Philadelphia.

The principal member of the bottom framing is a 31 by 3-16-in. steel side girder plate, reinforced on the bottom to prevent deflection by a 5 by 3 by $\frac{3}{8}$ -in. side sill angle, and on the top by a $3\frac{1}{2}$ by $\frac{5}{8}$ -in. steel bar, both of which continue in one piece around the body corner post to the bulkhead door post. The side girder plate is spliced at the corner post, merely a shop practice, but also continues around the same distance as its reinforcing members. End sills are of 10-in. channels, and crossings are 4-in. 5-lb. channels, with the exception of the first one back of each end sill; these bear the strain of the 7-in. $9\frac{1}{4}$ -lb. channel platform knees, and are of 6-in. 8-lb.



ALL-STEEL CARS FOR TRENTON, BRISTOL AND PHILADELPHIA STREET RAILWAY. Passenger and smoker car for suburban service mounted on Brill No. 39-E trucks

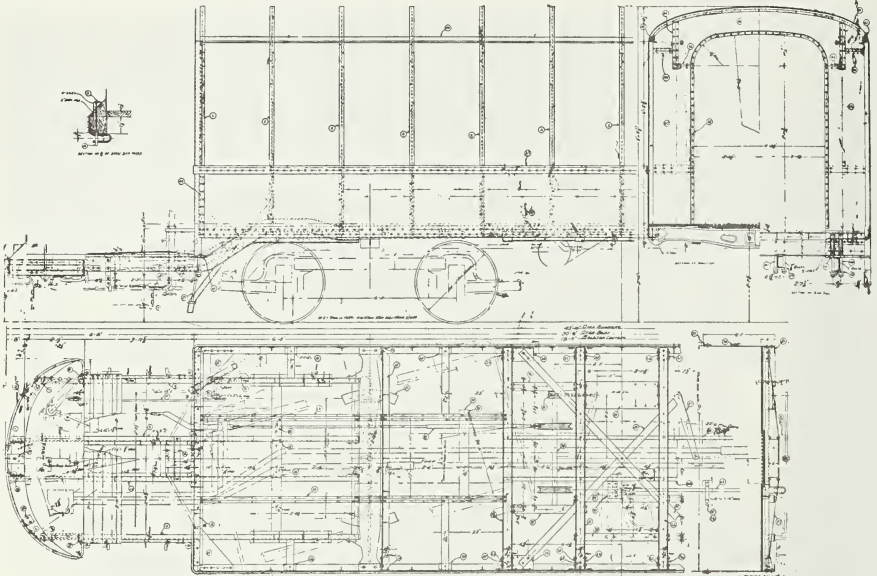


ALL-STEEL CARS FOR TRENTON, BRISTOL AND PHILADELPHIA STREET RAILWAY. The main compartment seats 32 and the smoking compartment, 16. Brill "Winner" seats with reversible backs in both compartments. Upper sashes are stationary, and lower sashes raise their full height

channels. Steel bars, 3 by $\frac{3}{8}$ in., are used throughout to brace the other members. In the upper framing, 2 by 2 by $\frac{1}{4}$ -in. tees, extending from side sill to side sill in one continuous piece, and securely anchored to the side girder plate and to the top plate, constitute both side posts and roof supports. These tee posts have white oak fillers on the inside, to which the finish is attached. The bulkhead framing, as shown on the diagram at the top of page 312, is of angles bent to shape; there are no doors in these bulkheads at the ends.

The 6-ft. platform at each end

of the car is enclosed by a stationary round-end vestibule sheathed on the outside below the windows with No. 10-gage sheet steel; the single sash in the upper part drop into pockets, and the one in center is arranged to be held at desired heights. There are no prepayment railings on the platforms, and the conductor is located up off the platform in the body of the car out of the way of incoming passengers, exit being made through the front door. At each end there is a conductor's stand, which contains the lever operating the folding step and two-part folding doors, having lower panels of wired glass,

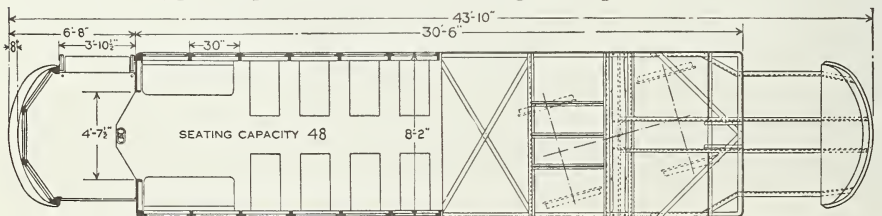


ALL-STEEL CARS FOR TRENTON, BRISTOL AND PHILADELPHIA STREET RAILWAY. Side and end elevations and plan view of a standard type of steel framing used for these cars

and also is equipped with a folding seat for the conductor. The operating mechanism under the platform is the Brill standard type.

All lower side sash raise, while the upper are framed in one continuous piece. The interiors of the cars are separated into smoking and main compartments, the former occupying the space of four windows. The partition between the two compartments has a single swinging door, glazed in the upper part. All seats are of the Brill "Winner" type, upholstered in

rattan, and, with the exception of the transverse seats against the partition, and the longitudinal seats, at the ends, which occupy the space of two windows, have reversible backs. In the smoking compartment one of the seats against the partition may be removed and a heater substituted in cold weather. The interiors are finished in cherry-stained mahogany, with the sides below the windows with agasote 3-16 in. thick, with sufficient air space between it and the side girder plate.



ALL-STEEL CARS FOR TRENTON, BRISTOL & PHILADELPHIA STREET RAILWAY. Height from track to side sills, 3 ft. 0 in.; side sills over trolley boards, 8 ft. 6 in.; track to step, 15 in.; step to platform, 14 in.; platform to floor, 10 in.

Twenty-six-Passenger Omnibuses for City System

Cleveland Railway Company

THE Cleveland Railway Company, Cleveland, Ohio, recently purchased three twenty-six passenger motor omnibuses, mounted on three-ton White chassis, from the G. C. Kuhlman Car Company.

It is the intention of the railway company to operate these buses as feeders to the railway system in

outlying districts and in suburbs which have not developed to the extent which warrants railway extension. It is expected that this enlargement of transportation facilities will stimulate the growth and development of the suburbs to the advantage of both the city and the railway system.

The buses illustrated are designed for one-man prepayment



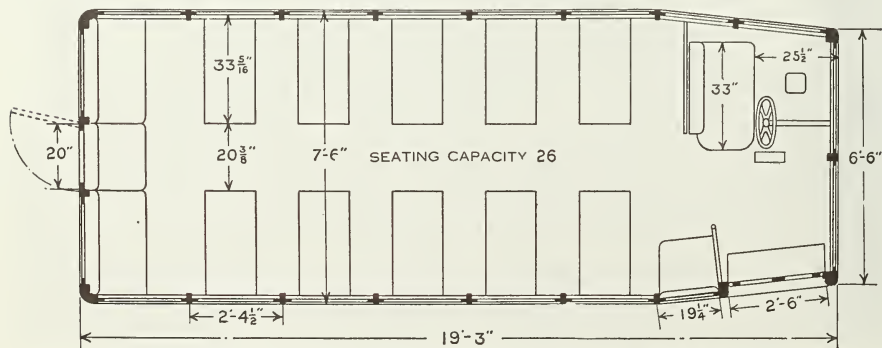
OMNIBUSES FOR CLEVELAND. An ash panel and iron stanchion separate the door from the first seat on the right-hand side



OMNIBUSES FOR CLEVELAND. Door and step arrangements obviate the necessity of a stairway well

operation, the entrance and exit of passengers at the forward right-hand corner of the body permitting the driver to collect the fares and control the operation of the simultaneously - acting folding doors and lower step from his position on the left side. All sashes are of the double type, the upper half being stationary and the lower arranged to raise. Directly in front of the driver's position, on the left side of the body, the sash is equipped with a glass shield,

visible in the illustration of the exterior, which prevents rain or snow interfering with his vision in stormy weather. Brill "Winner" seats, with stationary backs and upholstered in twill-woven rattan, arranged as shown on the diagram of the seating plan below, provide a maximum seating capacity of 26 for this size body. A section of the rear cross seat, directly in front of the emergency door, which may be operated by the passengers, is removable. The



OMNIBUSES FOR CLEVELAND. Roadway to side sills, 3 ft. 2 3/4 in.; side sills to roof, 7 ft. 2 3/4 in.; floor to headlining, 6 ft. 7 3/4 in. Roadway to bottom step, 18 3/8 in.; bottom to top step, 13 in.; step to floor, 13 in.

driver's seat, upholstered in leather, is located directly over the gasoline tank. The heating system is connected to the exhaust from the engine, and is equipped with valves with which the exhaust may be transferred to the muffler in warm weather. Ventilation is obtained through two ventilators located on the top panel on each side of bus.

In the underframe, the construction may be called composite; the side sills, $2\frac{1}{4}$ by $4\frac{5}{8}$ in., rear-end sills $2\frac{3}{4}$ by $5\frac{5}{8}$ in., and cross

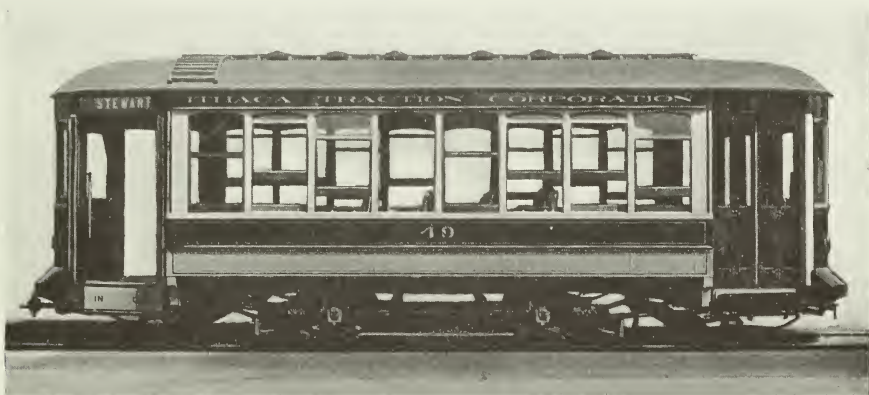
member fillers, $1\frac{3}{8}$ by 1 13-16 in., are of oak, while the crossings consist of seven 3-in. 4-lb. channels with oak fillers, mentioned above, to which the flooring is laid. Ash is the material used in the upper framing, the corner posts being $3\frac{1}{2}$ in. thick, and the side posts $1\frac{3}{8}$ in. thick. The exterior sheathing is poplar. The three-ton White chassis on which these buses are mounted is of a special design, and is equipped with the Westinghouse air spring shock absorbers both at the front and rear.

New Equipment for Ithaca Lines

Semi-Convertible Window System

THE Ithaca Traction Corporation, formed upon the reorganization of the Ithaca Street Railway Company, which included the Cayuga Lake Electric Railway and the

Cayuga Heights Railway Companies, the early part of the present year, purchased a few weeks ago, from the Wason Manufacturing Company, a number of single-truck pay-within cars of the type illustrated. The new interests con-



NEW EQUIPMENT FOR ITHACA. Standard type of 32-passenger Brill Semi-Convertible car mounted on Brill 21-E truck. The outward-opening doors are operated in conjunction with folding steps by a lever on a stand at the center of the end sill

trol the street railway lines of Ithaca, in southern New York, having a trackage of $10\frac{1}{2}$ miles, and serve a population of approximately 15,000. A number of interesting features in connection with the construction of the new cars, which include the Brill Semi-Con-

strains and stand up well. Brill 21-E single trucks, on which the cars are mounted, have a wheel base of 8 ft. 0 in.

The underframes are composed of a number of wooden members bolted to steel angle members with $\frac{5}{8}$ -in. bolts. Wood and steel



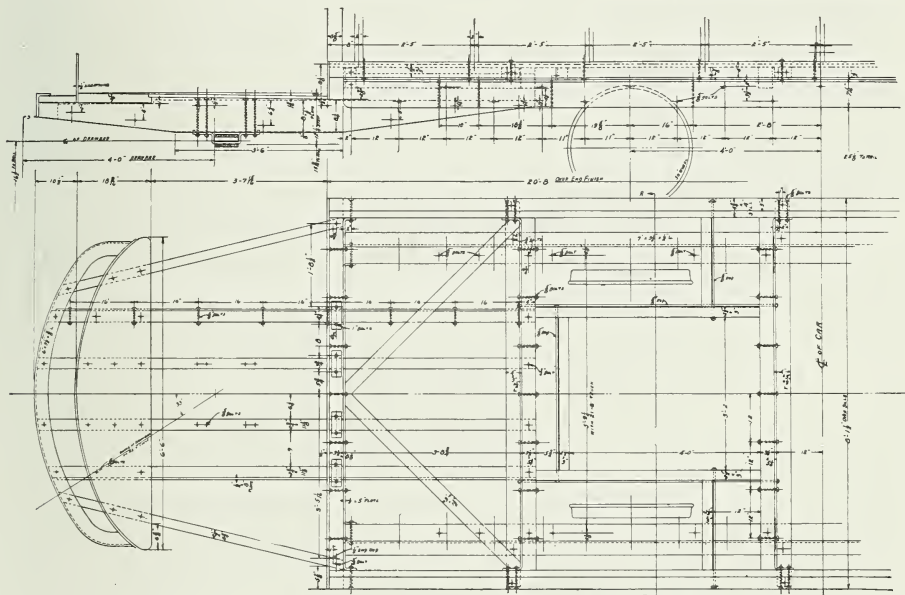
NEW EQUIPMENT FOR ITHACA. Semi-convertible window system, in which sashes disappear into roof pockets, eliminates side and wall pockets and thereby increases the aisle width

vertible window system, in which the side sashes disappear into roof pockets and permit the operation of the cars in both summer and winter, plain-arch type of roof, and the omission of bulkheads in the body ends, combine in producing a lightweight carbody of sufficient strength to take care of the maximum passenger load and various

are used in about equal proportions; double side sills of yellow pine, 3 by 4 and $1\frac{3}{4}$ by 4 in., end sills of oak, $3\frac{1}{2}$ by $8\frac{1}{8}$ in., reinforced on both sides by 5 by $\frac{1}{2}$ -in. steel plate, and oak crossings, $3\frac{1}{2}$ by $5\frac{1}{4}$ in., bolted to 4 by 3 by $\frac{1}{2}$ -in. steel angles, are the principal members. In addition, a steel angle, 7 by $3\frac{1}{2}$ by $\frac{1}{2}$ in.,

bolted to 4½-in. wooden member, extends from end sill to end sill close to the double side sills on each side. The members of the trap door framing are of oak, 2½ by 3 in., and, as shown in the diagram below, are connected to the side sills by ⅝-in. rods. Diagonal braces of 3 by 1½-in. steel plate

junction with the single folding step, with a lever located on the stanchion at each end of the body by the conductor, who stands off the platform, up on the car floor. The interior finish is of cherry and the trimmings of bronze. Brill "Winner" seats, upholstered in twill-woven rattan, provide seating



NEW EQUIPMENT FOR ITHACA. Height from track to side sills, 2 ft. 8½ in.; side sills over trolley boards, 8 ft. 5⅜ in.; track to step, 15⅝ in.; step to platform, 12¼ in.; platform to floor, 8⅝ in.

are shown in the forward end of the diagram. The body corner posts are 3⅝ in. thick and the side posts 2-in. thick, both being of ash.

The windows in the vestibules are fitted with single sash, which drop into pockets in back of the sheet-steel sheathing. Both platforms are arranged for the pay-within method of fare collection, all door openings being fitted with four-leaf folding doors which open outwardly, and are operated, in con-

accommodations for 32 passengers; this is obtained with four of the transverse type, having push-over backs and pressed steel pedestals, wall and aisle plates, on each side of the aisle, and two longitudinal seats at each end, occupying the space of two windows each. Brill "Dumpit" sand boxes, "Dendenda" platform gongs, "Retriever" signal bells and track scrapers are included in the special equipment of these new cars.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

Conductors

THE business of a conductor calls for alert thought and action, unflagging courtesy, punctual and steady habits, rugged honesty and neat appearance.

Don't tell a passenger what the company needs to do to improve things—write it to the manager; he will regard you as a booster, while the passenger will take you for a kicker.

A conductor without courtesy is like a journal box without oil.

The pure gold of genuine courtesy will stand the acid test of mean treatment.

A courteous manner advertises you to be a gentleman.

Courteousness is real kindness to all, always.

Motormen

SOME DONT'S.—Don't expect all cars to operate alike. Don't get mad if the brakes won't work as freely as they might—make the best of it. Don't crowd the car ahead. Don't give the teamster who is blocking the track the satisfaction of "getting your goat." Don't expectorate in full view of passengers. Don't wrangle with your conductor or any employe of the company—be popular. Don't omit any courtesy of word or act. Don't get rattled whatever happens. Don't forget that you are occupying a highly responsible position.

A good motorman never exhibits his perfect control of his car by stopping within a few inches of his leader. He realizes that it would look as if he didn't know how to stop and just missed bumping by fool luck.

To run a car well is an art. Study your motions—cut out lost motion. Learn to adapt yourself instantly to any motor and brake apparatus which you may operate. Feel your starts and stops, and make them smooth. Know when to drift.

Courteous Conductor's Contest

AS the conductors on the cars of this company come in closer contact with the public than any other part of our organization, and as courtesy is expected of them at all times, we ask our patrons to co-operate with us in a special recognition of the importance of courtesy by writing to "Courteous Conductor's Contest," No. 100 Blank Street, describing any special act of courtesy or the courteous handling of a difficult situation on the part of conductors. Please give the conductor's number as shown on his cap, the date of the occurrence and your name and address (name and address of writers will not be published). The contest will begin November 1st and close November 30th. Two public school teachers will be asked to serve on a Committee of Award with one railway official. Three conductors will be selected as the winners whose special acts of courtesy and courteous handling of difficult situations, during the contest period, secure for them either the largest number of letters, or letters in which the situation described show highest forms of courtesy. The prizes will consist of scarf pins. If at the time of the award any conductor is found to have asked for any letter, he will be eliminated from the contest. Letters applying to conductors who leave the employ of the company before the contest closes will not be considered.

A Suggestion Box

JUST inside the main entrance to the Transit Building, No. 100 Blank Street, is a Suggestion Box. The public and the company's employes are invited to put in this box, or mail to it, suggestions for improving the railway service in any particular. The Suggestion Box Committee will meet once a month and go carefully over each suggestion submitted, and will award suitable money prizes for those that are of practical value. Please give name and address (the company's employes will give department and badge number), and enclose in envelope, addressed "Suggestion Box," Transit Building, No. 100 Blank Street.

Appearance of Car Crews

THE management wishes to express its appreciation to the motormen and conductors who are habitually neat in their appearance. The man who keeps his uniform clean and pressed, has no unmended tears and worn spots, no missing or loose buttons, who wears clean shirt, collar and cuffs, keeps his shoes blackened and gives himself a daily shave, not only represents the company to better advantage, but makes himself feel good and increases his self-respect and the respect of all who see him. The effort needed is hardly noticed when it becomes a habit, and the cost is offset by the longer wear that well-kept clothes give.

Office Slogans

TEMPER enthusiasm with responsibility.

Be tremendously energetic, but be equally thorough.

Concentrate on the thing in hand, but think ahead.

It pays to make yourself strong for your work by the right amount and kind of recreation.

An idea is an unformed thought; turn it into an informed thought before expressing it.

Be professional—make yourself an expert, an authority on your job and everything directly connected with it.

Will-power is the force that raises and holds you to the best that is in your mind.

More Newly Worded Warnings

DON'T make a practice of crossing streets at other places than the regular crossing—warn children against this dangerous habit.

A dangerous combination—wind, rain, an umbrella, and a busy street to cross.

Parents and school teachers—Whenever you see anything in the newspapers about a child being run over or hurt by cars, autos or wagons, read it to your children.

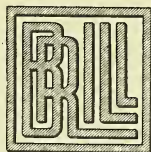
Never enter nor leave a car with both hands busy with packages, umbrella, bag, etc.—keep one hand free for taking hold of the safety handles.

Look out for your eyes! Look out for other passengers' eyes! Long hatpins sticking out, umbrella and cane ends pointing upwards, are dangerous.

If obliged to stand, please face the side of the car, as in that position you can brace yourself better when the car starts or stops.

Changes of Address

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



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BRILL SWEEPER CHAINS

are made for heavy work. They have malleable rollers and drop-forged links made in dies which prevent the slightest variation. They are carried in stock and can be shipped immediately upon receipt of order.

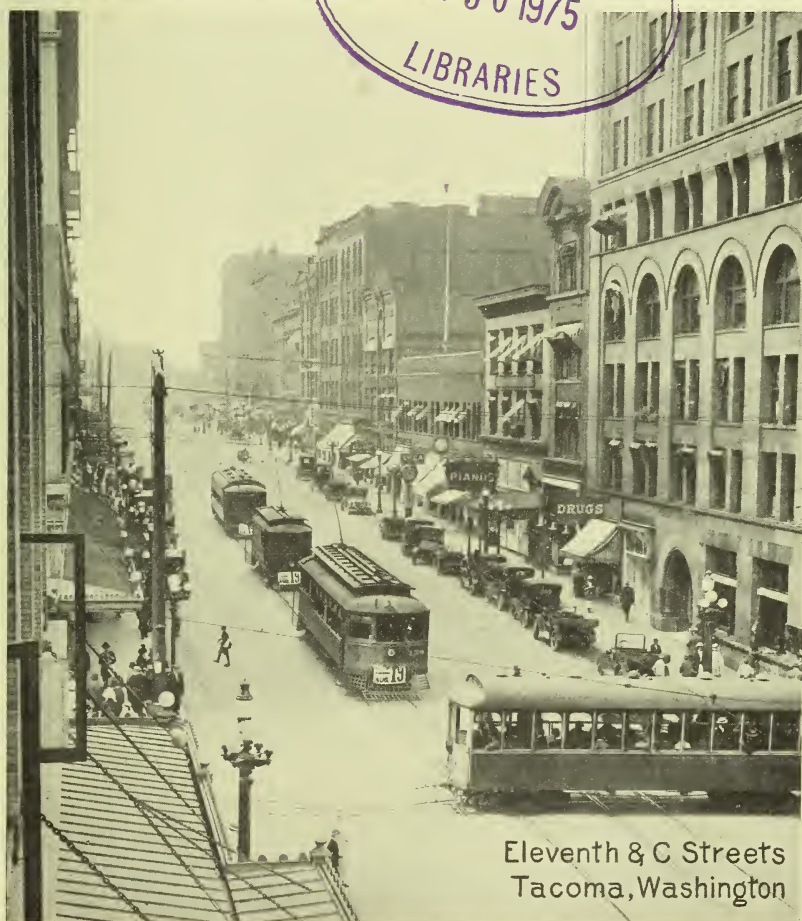
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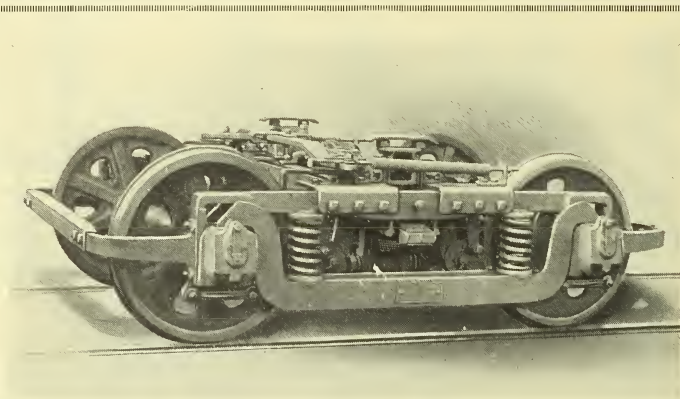
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Tacoma, Washington



BRILL 27-M.C.B. TRUCK

THIS is the Brill standard high-speed truck, and it is built in different sizes to suit all interurban loads and speeds. Although it has the "Master Car Builder's" system of equalization, it is distinctly a Brill product, because it has solid-forged side frames with low end frames, fold-over gusset plates, bulb-angle transoms, double- and single-corner forged transom brackets, "Half-Ball" brake hangers, friction springs at the bottom of the bolster swing links, short bearings for the equalizing bars in pockets on the journal boxes, pressed steel pedestal wear-plates or gibs, planed faces of the pedestals to give an accurate fit to the gibs, oil-retaining center bearings, and in fact, every part of the truck, from center plate to boxes, bears the impress of Brill experience, facilities and development.



W. Teek

PRESIDENT AND GENERAL MANAGER
PORTO RICO RAILWAY, LIGHT & POWER COMPANY

November 15, 1914


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F. W. Teele

FRED WARREN TEELE, President and General Manager of the Porto Rico Railway, Light & Power Company, was born at West Somerville, Mass., December 5, 1869. He took the course of electrical and mechanical engineering at Tufts College and graduated in the class of 1891 with the degree of A. M. B.; in 1903 he received the degree of M. Sc. During college vacations he served as foreman of line construction department of the Somerville Electric Company. Immediately after graduating, he entered the employ of the West End Street Railway Company, of Boston, first as draftsman, soon after as foreman of the dynamo room, and later as foreman of interior construction department—installing everything electrical up to M. P. 500-d.c. generator, the largest size then built. From April 1, 1893, to September 1, 1894, he served as erecting engineer with the Westinghouse Electric & Manufacturing Company. He then returned to the West End Street Railway (afterwards the Boston Elevated Railway) and served, respectively, as superintendent of power distribution system, assistant electrical engineer, and chief engineer of three large central power stations. From September 1, 1901, to the present he has been connected with the Montreal Engineering Company and the Royal Securities Corporation, Ltd., of Montreal, as consulting engineer. During this time (1901-09) he was general manager and consulting engineer of the Trinidad Electric Company, Port-of-Spain, and had charge of planning, construction, and operation of power station, street railway and lighting systems. He was also (1903-10) general manager and consulting engineer of the Demerara Electric Company, Georgetown, B. G., rebuilding lighting lines and power station, reconstructing street railway system and extensions, and reorganizing entire business operations. He was consulting engineer (1904-10) and had complete charge of rebuilding and enlarging power station, constructing lighting lines and the new street railway system for the Camaguey Electric Company, Cuba. As president, general manager, and consulting engineer of the Porto Rico Railway, Light & Power Company, of San Juan (1906 to the present), he has had complete charge of construction of two hydraulic developments, reconstruction and enlargement of auxiliary steam plant, construction of electric railway system and steam railway system, and laying out of high tension transmission lines and sub-stations, etc., lighting 31 cities and towns. Mr. Teele is a member of the American Society of Mechanical Engineers, National Association of Stationary Engineers, and the American Institute of Electrical Engineers.

Conditions Which Govern the Type of Car for City Service

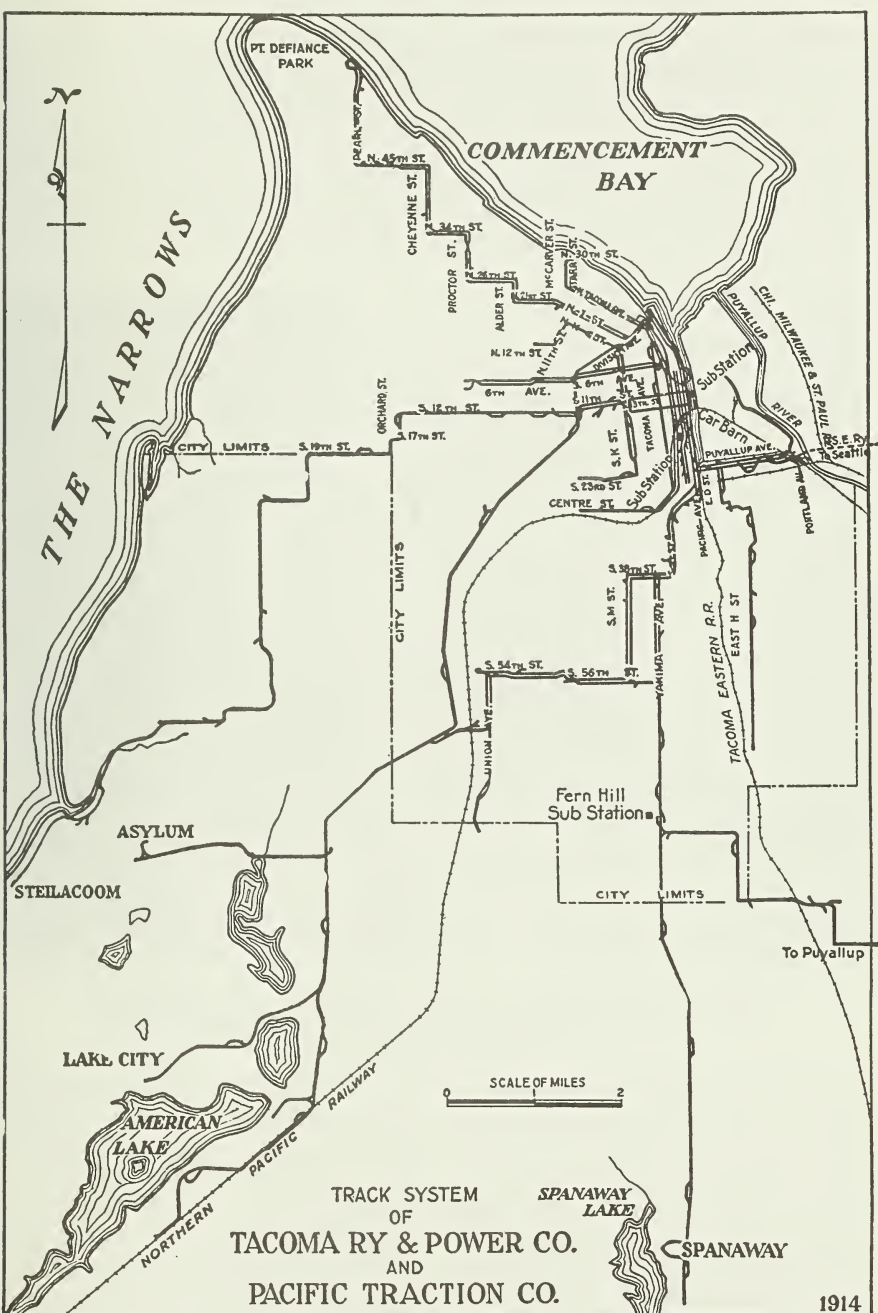
Tacoma, Washington

N a peninsula extending into the lower part of Puget Sound there was, forty years ago, a village of a few hundred inhabitants—today there is a city of 100,000 population. Tacoma is the third city in size in the State of Washington, and is one of the greatest commercial and industrial centers of the northwest. Its location and natural advantages are responsible for its marvelous growth, for it has a splendid harbor, and the topography of the adjacent territory furnishes easy access to the great continental railway systems which in the early days of its development recognized its advantages as a coastwise and ocean traffic point and the abundant resources of its neighborhood.

The land on which Tacoma stands rises abruptly from the water, forming bluffs behind which are terraces rising to a plateau. Farther back is the rolling land of South Tacoma, which descends gradually downward to a plain behind the city, extending to the mountains some 70 miles distant. The city may be said to face Commencement Bay on the northeastern side of the peninsula, an arm of Puget Sound with space and depth for an unlimited number of the largest ocean steamships. The bay

is free from shoals, reefs and rocks, and as the shore along the city front descends directly into deep water, it has been unnecessary to dredge or fill at any point; therefore, the docks are constructed lengthwise of the waterfront, and vessels of the deepest draft are able to moor alongside. There are 14 miles of harbor waterfront within the city limits, and 12 miles additional are projected on the tide lands at the end of the bay. As all the docks are furnished with railway facilities, many factories and manufacturing plants are so located that they are enabled to receive raw materials and ship finished products either by rail or water. The port is connected regularly with all of the principal foreign countries, as well as with the coastwise points of North and South America.

Of the great transeontinental railway systems which have provided the greatest stimulus to the growth of the city, the Northern Pacific was for many years the only railway with its terminus at Tacoma. Next came the Chicago, Milwaukee & Puget Sound Railway Company and, subsequently, the Oregon & Washington—at that time a division of a group of railways including the Union Pacific and Southern Pacific with their connections, but now a part of the



Oregon-Washington Railroad & Navigation Company. Lastly, the Great Northern extended its lines to Tacoma. In all, four immense railway systems give main line connections with practically every great distributing or producing center in the United States. Ta-

ered with forests; a large part of these forests consists of giant fir and cedar trees, from which solid timbers from 100 to 120 feet long and 20 to 26 inches square are shipped to all parts of the globe. It is estimated that the value of the annual product of lumber alone is



TACOMA TRAFFIC CONDITIONS AND CARS. Pacific Avenue at Eleventh Street is the heaviest street car traffic point in the city. During morning and evening rush hours cars cross at the rate of about one each minute. Eleventh Street has a single-track cable line

coma is also connected by electric railway lines with Seattle and Everett.

The principal industries of Tacoma are lumber, timber and planing mill products, flour and grist mill products, and lead smelting and refining. Much of the land within 100 miles of the city is cov-

\$10,000,000. In the flour mill industry, Tacoma is said to be the largest center west of Minneapolis, and one of the principal cereal manufacturing points in the United States. The wheat warehouses along the City Waterway are a mile long under a continuous roof. Some idea of the extent of

the smelter works will be had from the statement that the annual output is in excess of \$10,000,000. It is said that Tacoma has the largest smelter west of Butte. Other important manufactures are engines, machinery, shoes, water pipes, furniture, ships and boats. The car

for the hydro-electric generating plants which supply the current for industrial as well as municipal use.

The importance of Tacoma as a wholesale, jobbing and distributing center is indicated by the fact that about 200 different establishments



TACOMA TRAFFIC CONDITIONS AND CARS. Another view of the traffic point shown on the opposite page. Looking east on Eleventh Street, with bridge over steam railways and City Waterway in the distance. A cable car is approaching and about to cross Pacific Avenue

building shops of the Chicago, Milwaukee & Puget Sound and the Northern Pacific systems are extensive, and employ a large number of men. There is a large coal supply from rich deposits in the neighborhood, and there is abundant water power from the swift and never-failing mountain streams

are transacting business throughout the Northwest, and considerable business is done in Alaska, the Hawaiian Islands and the Orient. The retail district covers a considerable area, and includes a number of large department stores. Many high office buildings and other modern business structures are lo-

cated in this section; among the former is one of the tallest buildings on the Pacific coast. In this section are also the City Hall and the recently completed Federal Post Office and Custom House.

On the high ground back of the business district are located the

building and the waterfront is a great stadium built in a natural amphitheatre and surrounded by 29 miles of concrete seat tiers, with a capacity of 35,000 persons. Farther along the bluff is the Whitworth College. The University of Puget Sound and several academies



TACOMA TRAFFIC CONDITIONS AND CARS. In the southern part of the heavy traffic district. Looking north on Pacific Avenue from Seventeenth Street. The interurban car is starting for Seattle

Pierce County Court House with its magnificent clock tower, which can be seen for many miles in all directions, and other fine public buildings. On the bluff overlooking the bay stands the Tacoma High School, the largest structure used exclusively for high school purposes west of Chicago; between the

and seminaries have fine locations. There are seven public parks, having a total area of 1,120 acres; of these, Point Defiance Park occupies 631 acres and is situated on the bold headland at the apex of the peninsula, with a shore line of six miles. Wright Park, at the center of the city, adds much to its



TACOMA TRAFFIC CONDITIONS AND CARS. Main entrance to Point Defiance Park. The park occupies the high promontory at the end of the peninsula, and has an area of 631 acres



TACOMA TRAFFIC CONDITIONS AND CARS. Cars on the trolley loop at the entrance of Point Defiance Park. The park and the five-mile scenic ride from the center of the city are very popular

beauty, and is the location of the Seymour Conservatory. The terraces rising from the bluffs along Commencement Bay, and the plateau above, which averages about 300 feet above sea level, are covered with residences. Each home stands in its own plot of ground, and the

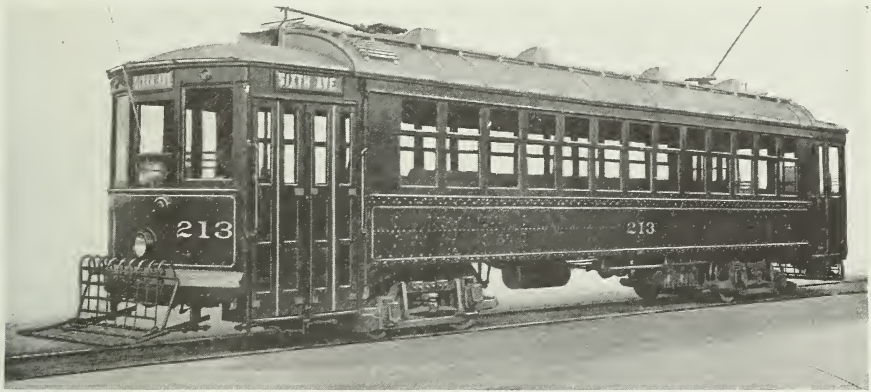
leys watered by the streams from the mountains are fertile and populous. The principal characteristic of the magnificent scenery around this attractive region is the snow-capped crest of Mt. Tacoma, 70 miles to the southeast and rising to a height of 14,532 feet above



TACOMA TRAFFIC CONDITIONS AND CARS. Ninth Street and St. Helens Avenue, in the northern part of the business section. These lines serve one of the most populous residential districts on the peninsula

natural rise of the land gives to each tier of streets and dwellings fine views over the water and of the distant mountains. There are few cities in the world which have as attractive residence sections as will be found here, and the streets and bridges have been constructed in a substantial and attractive manner. The "prairie" and the val-

leys water level. Tacoma is especially favored in regard to climate, as the temperature in summer is normally below 70 degrees and rarely drops below the freezing point in winter. While there is no rain during the summer months, there is never a lack of water, as the rivers have a never-failing supply from the glaciers and snow of Mt. Tacoma.

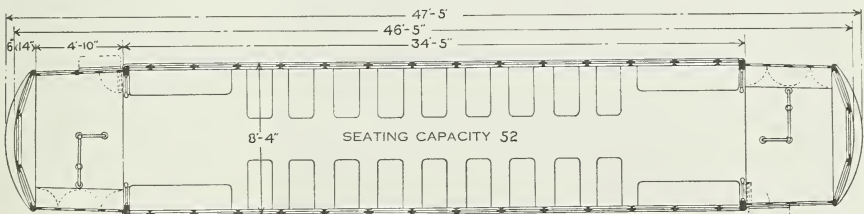


TACOMA TRAFFIC CONDITIONS AND CARS. Standard city car of the Tacoma Railway & Power Company. Steel bottomframe, sides and posts. Mounted on Brill 39-E Single-Motor Trucks

Electric, hail or wind storms are unknown.

According to the street map of Tacoma, the layout of the city is remarkably orderly and uniform, as practically all the streets in the entire area and the suburbs run at right angles to each other, north and south, east and west. The business section is at the lower end of Commencement Bay; the factories are along the waterfront of the bay, on the tide lands east of the business section, and along a narrow valley which curves across the base of the peninsula. South of this valley is called South Tacoma, and with its environs comprises the larger part of the residence dis-

trict, although the peninsula is for the most part occupied by homes. The accompanying map indicates the distribution of population, and shows the fan-shaped radiation of the lines from the business district. The large area covered by the business district, although formerly the original townsite, has wide, straight streets. These give ample room for vehicle traffic, and thereby obviate to a large extent the congestion of traffic which would otherwise result from the convergence of a large number of street railway lines within a few blocks. Within a comparatively small area are the great office buildings, department stores, and nearby is the Union



TACOMA TRAFFIC CONDITIONS AND CARS. From track to side sill, 2 ft. 9½ in.; from floor to center of ceiling, 8 ft. Track to step, 16½ in.; step to platform, 12 in.; platform to floor, 11½ in. Weight of carbody, 16,000 lb.; approximate total weight of cars and trucks, fully equipped, 39,000 lb.

Station, each with its large quota of passengers for the railway lines and requiring a large increase in the number of cars to handle the morning and evening peak loads. This restricted loading space for the cars, in combination with the long runs on nearly all divisions, necessitates a type with quick-loading facilities and large capacity. The design of car which has been adopted as standard is therefore longer than usual in city service, being 34 ft. 5 in. over the body and having 6-ft. prepayment platforms at each end; the seating capacity is 52. In normal daily operation an average of 58 cars is

used, and this number is increased to 97 during the rush-hour periods, which occurs between 6.45 and 8.45 in the morning and from 4.30 to 6.30 in the evening. The busiest traffic point in the business district is at the crossing of 11th Street and Pacific Avenue—views of crossing shown on pages 324-5—where an average of 33 electric cars and 20 cable cars pass per hour during the periods of heaviest traffic. The number of revenue passengers carried on the system during 1913 was 20,098,328 and the number of transfer passengers was 5,639,342; the total number of passenger car miles operated during that year

was 3,643,858. There are 67.92 miles of single track and 24.30 miles of double track, giving a total trackage to the system of 92.22. The gage of the track is 4 ft. 8½ in.; the shortest curve radius is 45 degrees, and the maximum grade on the electric lines is 12 per cent. On a short portion of the system in the business section, where grades are excessive, the operation is by cable. The Tacoma Railway & Power Company operates the entire street railway system of the city.

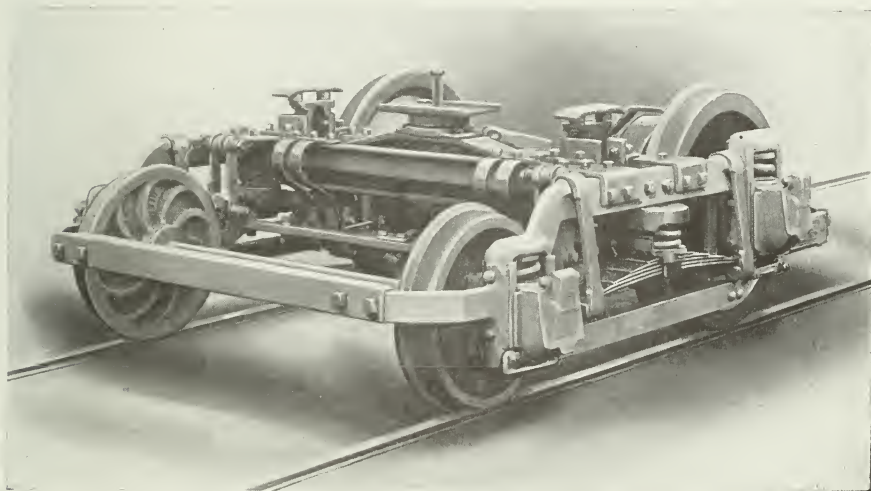
The new standard type of car of the system was put in operation during the present year, ten cars



TACOMA TRAFFIC CONDITIONS AND CARS. Absence of bulkheads and headlining are notable features. Upper window sashes stationary; lower sashes raise. Mahogany finish

comprising the initial equipment. These cars have steel bottomframes, with steel side girder construction and T-posts which are continued from side to side in a single piece and support the plain-arch roof. The floor plan, together with interior and exterior illustrations and their accompanying inscriptions, show all of the principal de-

or up to between a half and a full load of seated passengers, the soft-acting coil springs under the bolster impart a remarkably easy riding motion to the carbody. When a certain load is reached the coil spring seat castings come in contact with the bolster, and thereafter the spring motion is transferred to the semi-elliptics. The trucks have



TACOMA TRAFFIC CONDITIONS AND CARS. Brill 39-E Truck furnished for the latest built cars. Wheel base, 4 ft. 6 in.; diameter of wheels, 33 and 22 in.; journals, $3\frac{3}{4}$ by 7 in. and 3 by 6 in. GE-233A, 60 hp. motor

tails of the cars. The cars are not of Brill manufacture, but are mounted on Brill single-motor trucks of the 39-E type. These trucks have the new spring arrangement, known as the Brill Graduated Spring System, for light and heavy loads. This spring arrangement is clearly shown in the accompanying photograph of the Tacoma truck, and consists of coil springs between the semi-elliptics and the ends of the bolster. While the carbody is running light,

solid forged side frames, "Half-Ball" brake hangers, and in other respects are of standard Brill construction. The ratio of brake pressure on the pony wheels is arranged in accordance with the proportion of load which they carry, and these wheels have a brake beam as well as the driving wheels, keeping all shoes in correct alignment. Aside from the fact that these trucks have superior riding qualities, they have the important advantage of carrying the carbody low.

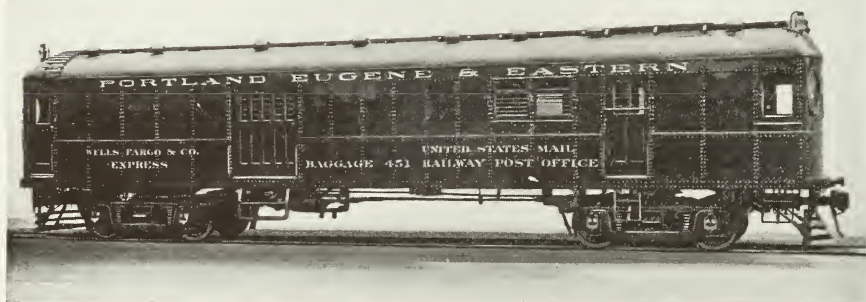
All-Steel Cars for Portland, Eugene & Eastern Railway

Combination Mail and Baggage Type

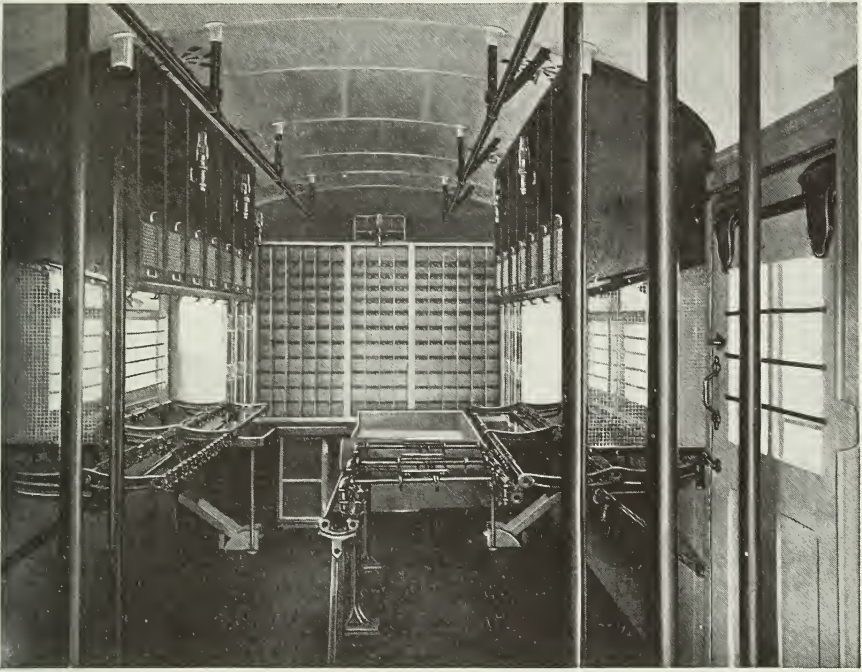
THREE all-steel combination mail and baggage cars have arrived at Portland, Oregon, after the long trip on their own wheels from The J. G. Brill Company, Philadelphia. These cars are for the Portland, Eugene & Eastern system—a subsidiary of the Southern Pacific—comprising 144 miles of lines running east from Portland and which, when completed, will comprise 350 miles.

The cars are of particular interest, both on account of the type and of the method of design. Government specifications relating to all-steel cars for railway mail service are very rigid in their requirements regarding strength of material, insulation against heat and

cold, and the details of mail handling equipment, it being desirable to standardize these features. As these were the first steel mail cars ever built for electric railway service, and the government specifications covered only cars for steam service, numerous difficulties were encountered. The width of the car was to be less than the minimum specified; an enormous buffing shock had to be resisted—namely, 400,000 lbs.; the insulation against heat and cold required was of an unusual character; and the thickness of the side sheathing was greater than would work out satisfactorily in the general construction plan. These, with other difficulties, were overcome through the co-operation of the Railway Mail Service Department. The mail



ALL-STEEL MAIL AND BAGGAGE CARS. Both sides of these cars are alike, with exception of vestibule doors being at diagonal corners. Electrical equipment, including multiple-unit control, was installed at destination



ALL-STEEL MAIL AND BAGGAGE CARS. With exception of toilet in corner next the vestibule, one end of mail compartment is left free for piling mail bags

compartment was given its complete standard equipment within the narrower limits of space by slight changes in arrangements. The illustration of the interior of this compartment is looking toward the center of the car, and shows the arrangement for holding the mail bags and sorting and distributing mail matter. The other end of the compartment is free from apparatus and used for piling mail bags. A toilet of metal construction is in the corner next the vestibule.

The buffing shock—400,000 lbs.—required in steam service was reduced 50 per cent., which is ample for cars operated in trains equipped with multiple unit con-

trol. The longitudinal members of the underframe consist of two 7-in. 15-lb. I-beam center sills and two 6 by 3½ by ⅜-in. angle side sills; there are also two 6-in. 8-lb. channels at each end extending from the bolster to the end sill. The cross members consist of 4-in. channels, and across the framing at the end sills are 3/16-in. floor plates; these floor plates, together with a short longitudinal sill from the end sill to the bolster, and an 8-in. 20¼-lb. I-beam end post, have the important function of transmitting end shocks to the side construction. The sides are designed to carry the weight of the car, and are composed of 3/32-in. steel plates, 3 by 3 by 5/16-inch T-posts, 3 by 2½ by

5/16-in. angle belt rail, 3/16-in. pressed Z-top rail, together with the angle side sills mentioned in connection with the underframe. Each side is, therefore, a wide, powerful girder with ample margin of resistance to vertical deflection and horizontal strains.

the electrical apparatus underneath. At intervals on top of the sub-floor are placed 2-in. wooden floor strips, to which the floor proper is attached; the floor consists of two layers of yellow pine, the lower laid diagonally and the upper lengthwise. A magnesia

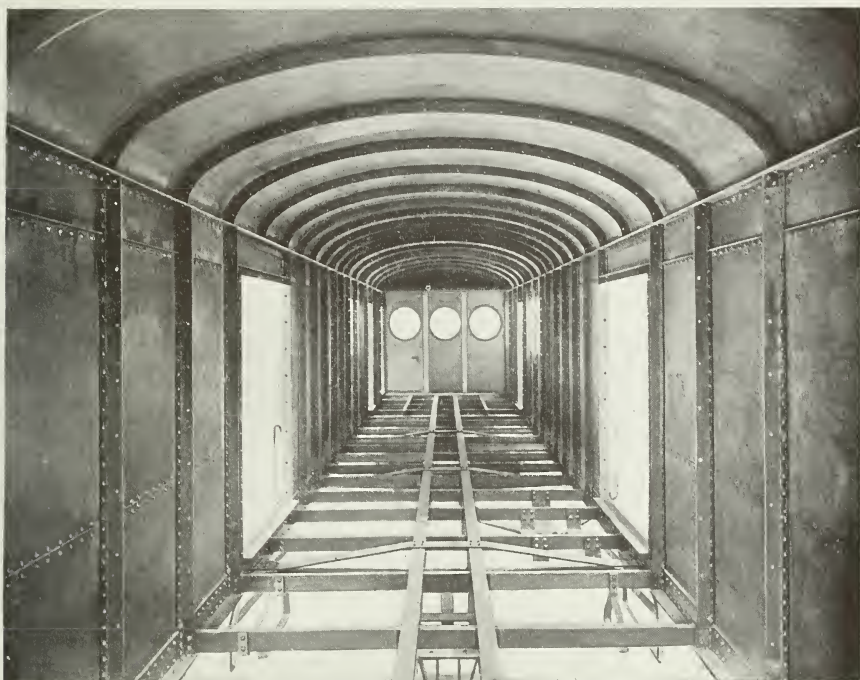


ALL-STEEL MAIL AND BAGGAGE CARS. View of baggage compartment, looking towards center of car. Galvanized metal sides and composition headlining have a lining of three-ply hair felt. Insulation against cold and heat is also provided by a one-inch magnesia compound laid on steel sub-floor

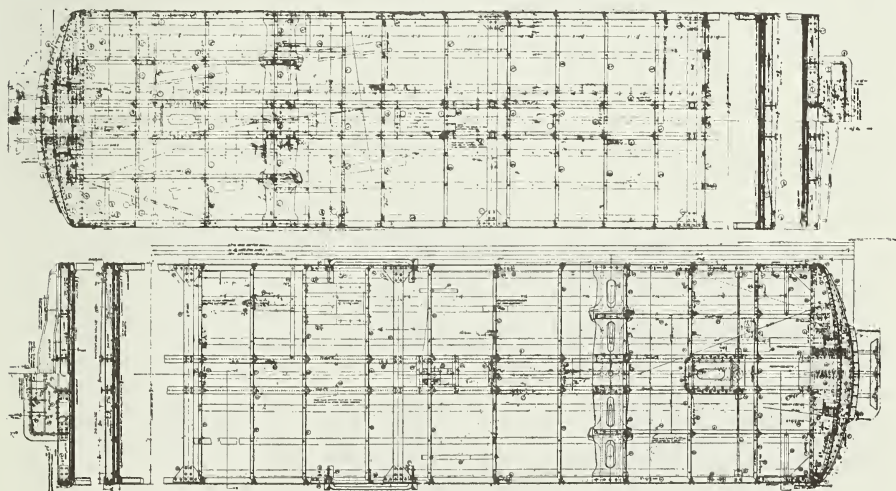
Although the cars are for operation in a mild climate, they were insulated against heat and cold in a manner suitable to rigorous climatic conditions. This was accomplished by a steel sub-floor laid on the underframe, which, in addition to supporting the insulation, serves as fireproofing in case of fire from

compound, 1 in. thick, is laid on the steel sub-floor, leaving a 1-in. air space between the compound and the wooden floor. Three-ply hair felt is placed in the sides, ends and roof, and held in place with small wooden furring strips inside the metal linings.

The roof is covered with No. 16



ALL-STEEL MAIL AND BAGGAGE CARS. In addition to carrying the weight, side construction takes buffing shocks, which are transmitted by means of a powerful framing arrangement



Upper diagram shows mail compartment end of bottomframe; lower diagram shows baggage end. Length over vestibules, 54 ft. 4 $\frac{1}{8}$ in.; over buffer beams, 55 ft. 4 in.; bolster centers, 35 ft. Width over side sheathing, 9 ft. 2 $\frac{1}{8}$ in. Weight of body, less electrical equipment, 43,060 lb.; weight of pair of trucks, less motors, 23,120 lb.

steel sheets riveted to the earlines and the side plates and is exposed. The baggage end of the cars is finished with unpainted galvanized sheets, and is equipped with a toilet, a desk and a letter case, all of metal. The bulkheads between the vestibules and the compart-

ments, and the partition at the center of the car are composed of steel, except for minor details of the trim. At the outer end of the baggage compartment is a double bulkhead, with the space between used partly as a clothes closet and partly as a switchboard cabinet.

New Equipment for Lincoln

Motor and Trailer Types

THE American Car Company recently shipped to the Lincoln Traction Company four motor and two trailer prepayment cars mounted on Brill No. 39-E and No. 53-D trucks respectively. The Lincoln Traction Company controls the street railway system of the Nebraskan capital, and in addition operates the Lincoln, Capital Beach & Milford Railway, with a total trackage of

approximately 60 miles. Lincoln is in the southeast corner of the State and is the commercial and railroad center of a large and populous section. For several years the street railway traffic has grown at a rate with which it has been difficult to cope, owing to the heavy demands of limited rush-hour periods. It is expected that the operation of combined motor and trailer cars during these periods will relieve the situation. Both



MOTOR AND TRAIL CARS FOR LINCOLN, NEB. Single-end prepayment motor car.
Mounted on Brill 39-E Trucks

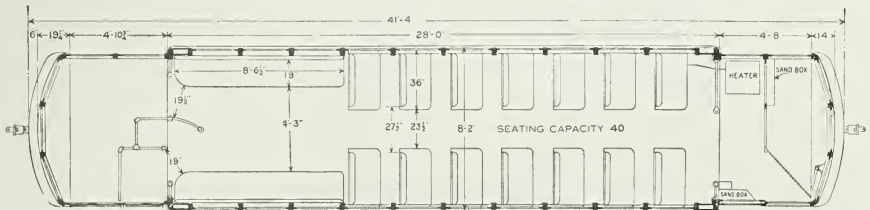


MOTOR AND TRAIL CARS FOR LINCOLN, NEB. Forward end of motor car, showing enclosed motorman's cab. Upper sashes are stationary; lower sashes raise

types are operated on the prepayment plan, and each train has a crew consisting of a motorman and two conductors.

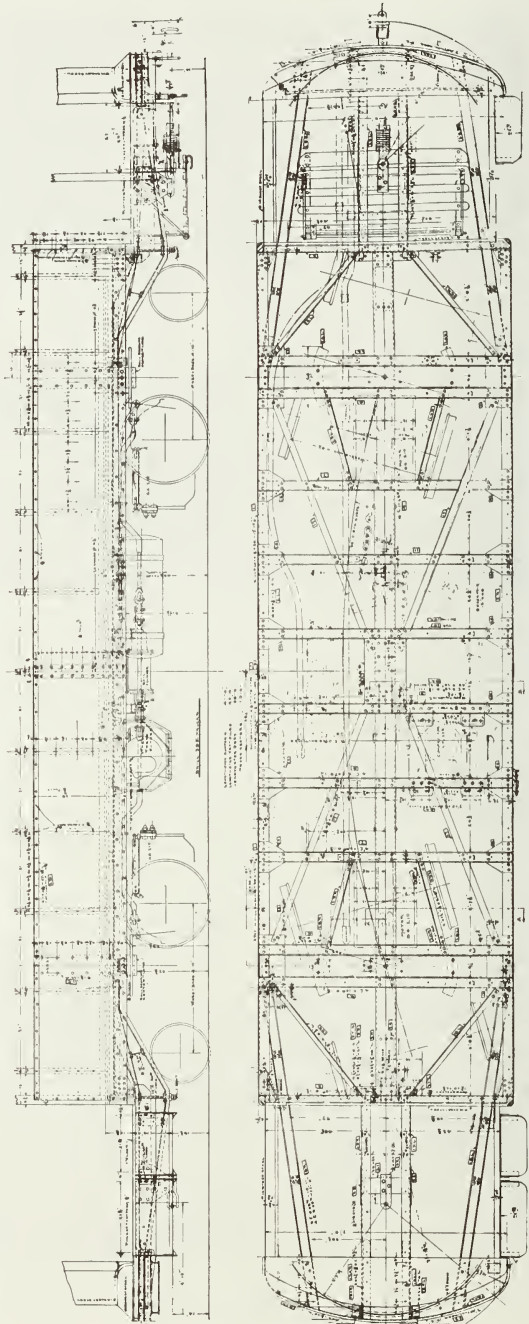
Below the belt rail the motor cars are practically all steel. The side girders are of 36 by $\frac{1}{8}$ in. steel, reinforced at the top by a 2 by 1 by $\frac{1}{4}$ -in. angle and at the bottom by a 5 by 4 by $\frac{3}{8}$ -in. angle form the side sills. The end sills are 10-in. 15-lb. channels, with web

vertically placed, and are securely riveted to 8-in. $11\frac{1}{4}$ -lb. channel center stringers, with web horizontally placed, thereby providing an unusually powerful construction practically in one piece. Four and 6-in. channel crossings complete the structure, which is diagonally braced by 2 by $1\frac{1}{2}$ by $\frac{1}{4}$ -in. steel angles and at the intersection of the cross and longitudinal members by steel gusset plates. The plat-



MOTOR AND TRAIL CARS FOR LINCOLN, NEB. Centers of side posts, 2 ft. 7 in.; height from track to side sills, 2 ft. $7\frac{3}{4}$ in.; from underside of side sills over trolley boards, 8 ft. $7\frac{3}{4}$ in.; from floor to center of ceiling, 7 ft. 6 in. Track to step, $15\frac{1}{2}$ in.; step to platform, 14 in.; platform to floor, $10\frac{1}{2}$ in.

forms are supported on 4-in. channel knees with 6 by 3½ by ⅜-in. and 3 by 2¼ by ⅜-in. angles as spreaders to which the platforms are bolted. As the cars are single-end operated, the platforms are open on the right side only. The rear platform is equipped with standard prepayment railings which separate incoming and outgoing passengers; the doors on this platform are the two-part folding type and are operated in conjunction with the folding step from the conductor's position. This platform is used only as exit, and is equipped with a single sliding door operated by the motorman simultaneously with the folding step. There are no bulkheads in the body ends. Brill seats are furnished throughout, the cross seats having stationary backs. The interior is finished in mahogany and all painting is done to match. Push buttons on each side post signal the motorman whenever a passenger desires to alight. All window sash, with the exception of the vestibule sash, which drop into pockets, are double, the upper half being stationary and the lower raising clear to the roof. The Brill 39-E trucks are of the latest design, with 33-in. driving



MOTOR AND TRAIL CARS FOR LINCOLN, NEB. Side elevation and plan view of bottomframe of motor car. Side girders are 36 by ⅝-in. steel plates reinforced with angles at top and bottom



MOTOR AND TRAIL CARS FOR LINCOLN, NEB. Single-end prepayment trailer mounted on Brill 53-D Trucks with 24-in. wheels

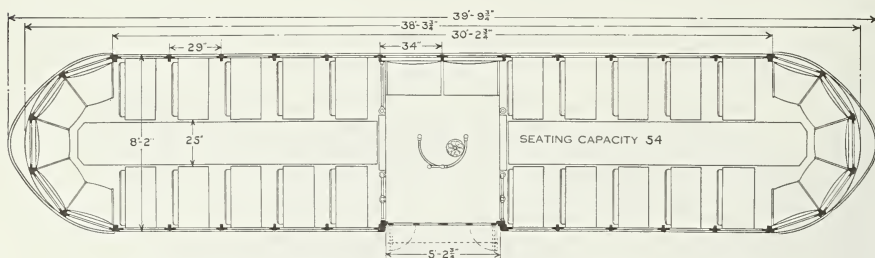
and 22-in. pony wheels, standard gage, and having the new spring system.

The trailer cars are practically of a standard design, being similar

to the cars which have been operated so successfully in Memphis and Chattanooga. They are built upon underframes having 7-in. I-beam side sills and 4-in. I-beam



MOTOR AND TRAIL CARS FOR LINCOLN, NEB. Interior of trailer. Crank handle on central railing operates both doors in unison and in conjunction with the folding step. Hand-brake wheel within railing

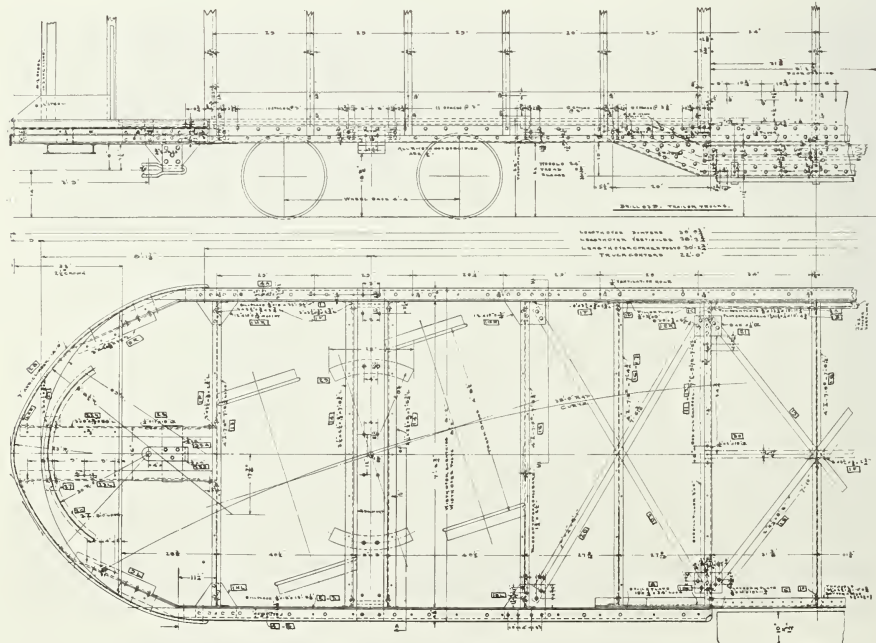


MOTOR AND TRAIL CARS FOR LINCOLN, NEB. Height from track to side sills, 22 in.; from underside of side sills over roof, 8 ft. 5 1/2 in.; from floor to center of ceiling, 7 ft. 8 3/4 in. Track to step, 11 1/2 in.; step to platform, 10 1/2 in.; platform to floor, 7 in.

end sills and crossings. This construction is reinforced by 1 1/2-in. tie rods extending down under each side sill and on the entrance side under the step brackets. Further stiffness is acquired by the box construction under the center platform, which, with the 24-in. wheels, permit a step height of but 11 1/2 in.

At the conductor's position on

the center platform, as shown in the illustration at the bottom of page 338, there is a stand containing a lever for the operation of the doors, a lever which rings the 4-in. signal bell located underneath the car at the forward end, signaling the motorman of the other car that it is desired to start and stop, and a brake staff and wheel. The in-



MOTOR AND TRAIL CARS FOR LINCOLN, NEB. Side elevation and plan view of bottom frame of trailer. The 7-in. I-beam side sills are reinforced by 1 1/2-in. tie rods

terior of these cars is finished in cherry, and Brill stationary back seats are used throughout. Six Brill "Exhaust" ventilators are placed equal distances apart along the

center line of the roof. As in the motor car, the upper sashes in the side windows are stationary and the lower sashes are arranged to be raised their full height.

One-Man Single-Truck Cars for Batavia

Double-End Operation

THE one-man Near-Side type of car illustrated, with platform at each end and mounted on Brill No. 21-E single truck, was recently built by the G. C. Kuhlman Car Company for the Batavia Traction Company. Batavia is situated midway between Buffalo and Rochester, on the New York Central Railroad, in the celebrated vegetable and fruit-producing district of Genesee County, New York. It has a population of some 12,500, and is the commercial and shipping center for the district, a large proportion

of the products going direct to the markets of New York and Boston from this city. Agricultural implements are its most important product of manufacture. The street railway lines are operated exclusively by the Batavia Traction Company, and consist of approximately eight miles of track.

Although these cars have a platform at each end, it is intended to operate them by utilizing the motorman, in addition to his regular duties of running the car and controlling the operation of the doors and steps, to collect the fares as the passengers enter the car by



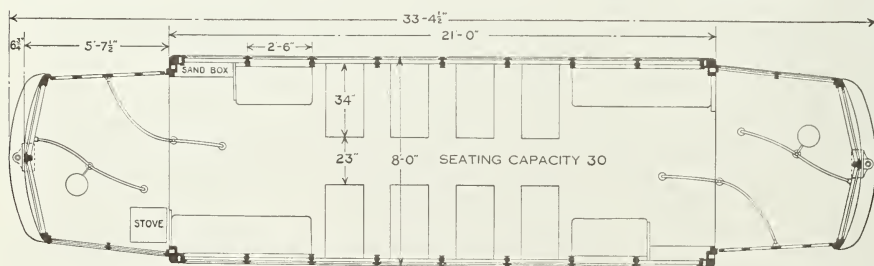
ONE-MAN NEAR-SIDE CARS FOR BATAVIA. Near-Side type for double-end operation, mounted on Brill 21-E Truck. Cars are for one-man operation



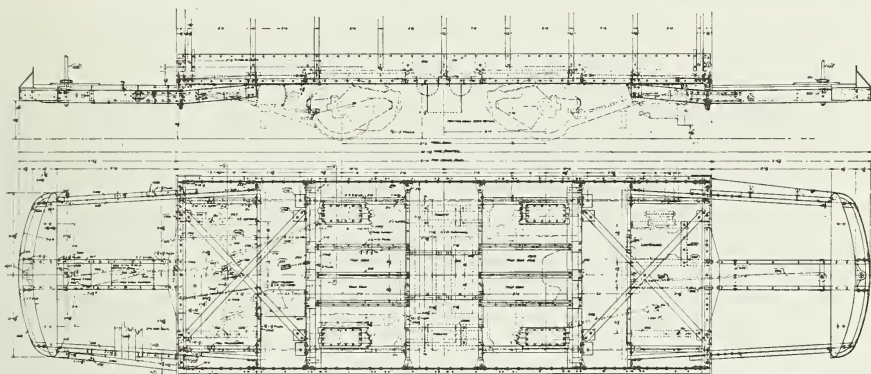
ONE-MAN NEAR-SIDE CARS FOR BATAVIA. Standard seating arrangement. The cars have Brill Semi Convertible window arrangement, and are finished in cherry with maple-veneer ceiling

way of the front platform, the doors at the rear being kept locked. The character of the terminals of the lines do not permit of single-end cars. There are a number of instances in which this type of car, although they measure but 21 feet

over the corner posts, are identical to the larger cars of the same type standard on many of the big city systems. The semi-convertible window system, in which the entire sash raises completely into roof pockets, thereby eliminating the



ONE-MAN NEAR-SIDE CARS FOR BATAVIA. Height from track to sills, 2 ft. 1 3/4 in.; from under-side of side sills over trolley boards, 8 ft. 6 3/4 in.; from floor to center of ceiling, 7 ft. 6 3/4 in. Track to step, 12 3/4 in.; step to platform, 12 in.; platform to floor, 6 3/4 in. Truck wheel diameter, 30 in.



ONE-MAN NEAR-SIDE CARS FOR BATAVIA. Side elevation and plan view. Steel side plates are 14 by 3-16 in., reinforced at top and bottom by steel angles

side wall pockets and permitting additional width to the aisle, the plain arch roof, independently operated entrance and exit doors with their individual steps, platform railings, and the omission of body-end bulkheads, feature the smaller cars as well as the large ones.

Steel plates and structural steel shapes are found in the under-frame; the side sills consist of two steel girders, 14 by 3/16 in., reinforced at the top by a 2 by 1 by 3/16-in. angle and at the bottom by a 2½ by 2½ by ¼-in. angle; the end sills are of 9-in. channels, and the crossings of 4 and 5-in. channels. Ash corner posts, 2¾ in. thick, and side posts, 2¼ in. thick, are the upright members of the body framing. These are securely bolted to the steel side girders and are covered up to the belt rail by a steel sheathing.

During the winter season a forced-draught heater is located on the platform directly behind the motorman, as shown in the interior illustration on page 340. The four cross seats on each side of the aisle

are of the Brill "Winner" type, with reversible backs, while the longitudinal seats in each corner are also of the Brill spring rattan-covered type. As noted in the diagram of the seating plan on page 341, the longitudinal seats at the diagonally opposite corner of the body adjacent to the closed side of the platforms are for the space of two windows, while those at the opposite corners are shortened to 36 inches in length to permit the passage of people leaving the car. All side sashes are of the semi-convertible type, but those in the vestibules are of the two-part type. Both sashes, upper and lower, in the vestibule window next to the body corner posts are stationary, while in the other vestibule windows the upper are stationary and the lower drop into pockets. The interiors are stained cherry rubbed dull, and maple veneer is used for the ceiling.

The Brill 21-E trucks under these cars have 30-in. wheels and a wheel base of 8 ft. 10 in. They have Brill "Wide-Wing" journal boxes.

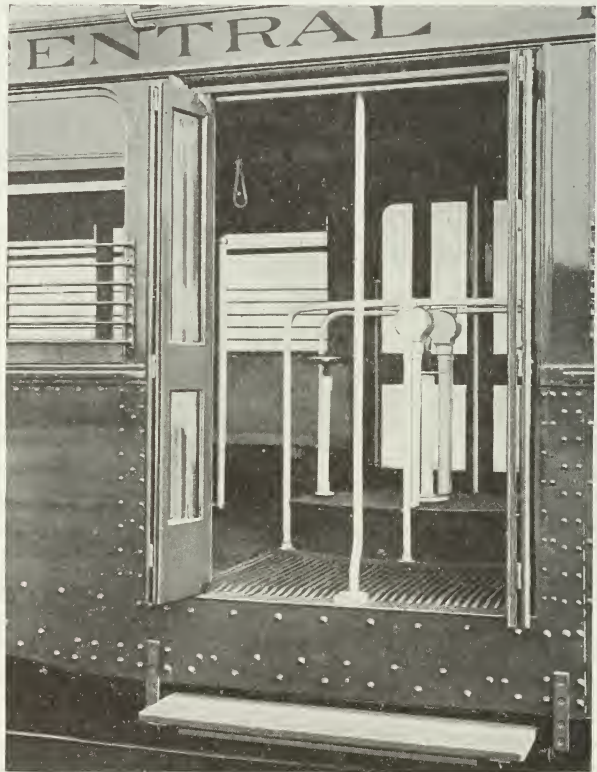
Center-Entrance Cars for Jersey Central Traction Company

Brill High-Speed Trucks

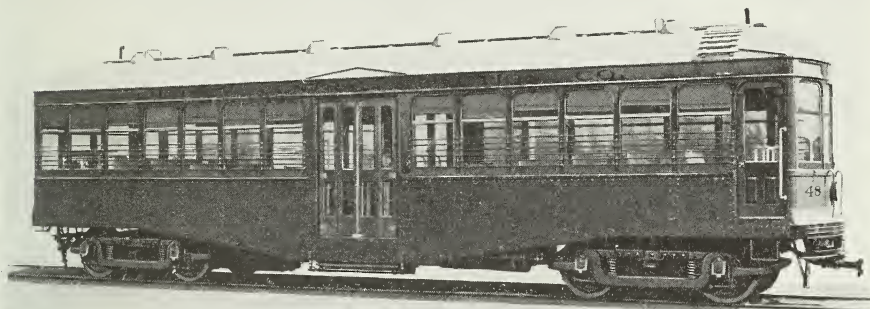
SIX cars of the type illustrated have just been put in commission by the Jersey Central Traction Company. They are radically different from other cars used on the lines, and are equipped for double-end operation and for the prepayment method of fare collection. They were built by The J. G. Brill Company and are mounted on Brill 27-MCB2 trucks, capable of a speed of 60 miles per hour. The Jersey Central Traction Company's lines begin at Perth Amboy, and after crossing the Raritan River, follow the New Jersey coast of lower New York Bay in a southeasterly direction to Red Bank, passing through Keyport, where one of its branches turns off toward Mantewan, and to Belfort, where its other branch turns off through Atlantic

Highlands to Highland Beach. In all, the company operates about 37 miles of track.

The underframes of these cars are constructed of steel plates and structural steel members, the side sills being of 6 by 3½ by ½-in. angles, with a depression under the



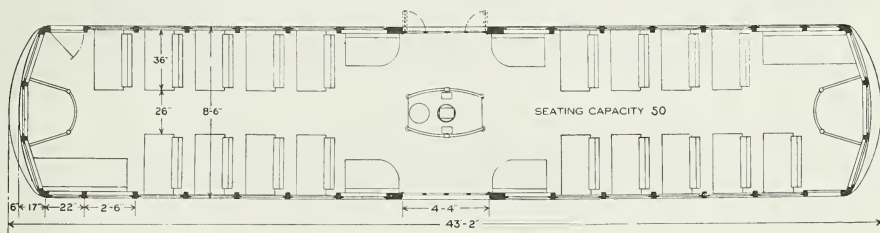
CENTER ENTRANCE CARS FOR JERSEY CENTRAL TRACTION. Doors and disappearing step are operated simultaneously by one handle. The raised conductor's platform enables the conductor to see over the heads of standing passengers and observe those entering and leaving



CENTER-ENTRANCE CARS FOR JERSEY CENTRAL TRACTION. Double-end center-entrance interurban type, mounted on Brill 27-MCB2 Trucks

central platform of 18 inches, commencing at the body bolster, where the lower edge is but 2 ft. 10 in. above the track; the center stringers of 5-in. channels are depressed in the same manner, and the crossings consist of 4-in. channels. Above the underframe the construction is of ash and yellow pine with a steel sheathing, $\frac{1}{8}$ in. thick, from the side sills to the belt rail; the corner posts are of ash, $3\frac{5}{8}$ in. thick, and the side posts, $2\frac{7}{8}$ in. thick. The steel sheathing is attached to the side posts by means of a steel angle on each side of the posts, riveted to the sheathing and bolted through the posts.

Both upper and lower sashes in the side windows may be raised into roof pockets, as they are of the Brill semi-convertible type; the window sashes in the ends drop into pockets. At diagonally-opposite corners of the carbody, and to the right of the motorman, is a single-swing door, 22 in. wide, through which the motorman enters and leaves his position, which is enclosed by a pipe railing. The floor slopes from the body bolster to the center platform in the same manner as the side sills. The center platform is 4 ft. 4 in. wide and is enclosed on each side by two outward-folding two-leaf doors fitted



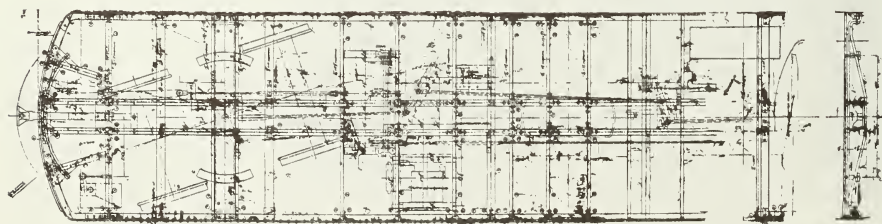
CENTER-ENTRANCE CARS FOR JERSEY CENTRAL TRACTION. Height from track over trolley boards, 8 ft. 11½ in. Track to step, 16 in.; step to platform, 15 in.; ramp of floor, 10½ in. Weight of body, less electrical equipment, 18,340 lb.; electrical equipment, 1600 lb.; air equipment, 1900 lb.; trucks, including gears, 16,280 lb.; four motors, 11,400 lb.; total weight, 49,520 lb.



CENTER-ENTRANCE CARS FOR JERSEY CENTRAL TRACTION. Floor is ramped from the bolsters down to the center platform. Conductor's platform is level with floor of the car at the ends. Brill Semi-Convertible windows with tandem sash raise entirely into roof pockets

with glass panels. These are operated in conjunction with a sliding step, which disappears under the carbody by an improved type of lever having a horizontal movement and which is a part of the

Brill door mechanism. In the center of the low central floor there is a raised platform on which the conductor's seat, fare register and the door mechanism lever are located. This raises the conductor to the



CENTER-ENTRANCE CARS FOR JERSEY CENTRAL TRACTION. Side elevation and plan view of bottomframing. The main sill members are 6 by 3½ by ½-in. angles

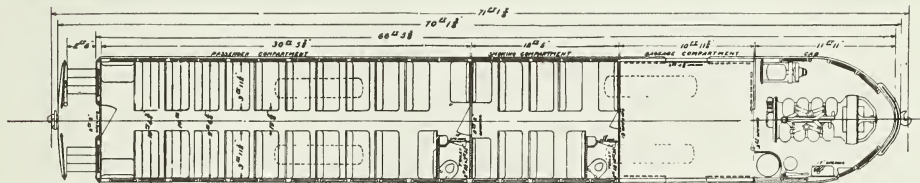
tering and leaving and also to keep the entire car under observation.

The Brill 27-MCB2 trucks have 6-ft. wheel base and 34-in. wheels.

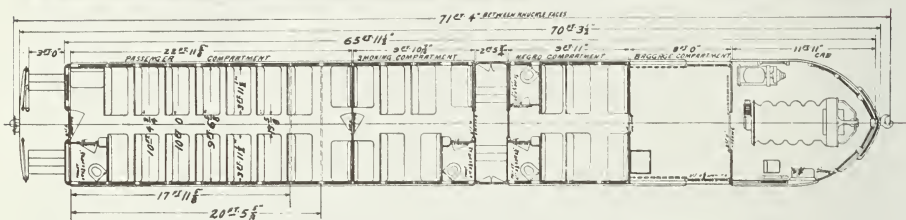
Gas-Electric System

The motor equipment consists of two GE-205 six-hundred-volt, box-frame, oil-lubricated, commutating-pole motors, nose-suspended, and mounted directly on the axles of the forward truck.

Eight cars, of the type illustrated below, having a seating capacity of 62, were delivered to the St. Louis & Southwestern Railway, known as the "Cotton Belt" Route, starting at St. Louis and following a southwesterly course across Arkansas into Texas. One branch of the road terminates



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G. E. GAS-ELECTRIC MOTOR CAR. Type 70-B-8. Four cars furnished to the Illinois Central

at Fort Worth, and the other runs through Waco and Comanche and terminates at Stephenville. The system has a total trackage of 1810 miles and numerous branches connect with important centers like Cairo, Ill., Memphis, Tenn., Little Rock, Ark., and Dallas, Texas. This type of car is known as type RE-70-B-11 and conforms in construction to standard gas-electric cars built for the General Electric Company, being divided into power, baggage, smoking and general passenger compartments. One of the cars is now operating between Shreveport, La., and Lewisville, Ark., a distance of 62 miles, having ten regular stops, seven flag stops and four railroad crossings, and requires but 2 hours and 30 minutes to make the trip; one trip and return is made each day. Another of the cars is in operation between Commerce and Sherman,

Texas, a distance of 57 miles and requires 2 hours and 40 minutes to make the trip.

The Illinois Central Railroad Company purchased four cars of the type illustrated at top of page for supplementary service on some of its connecting lines. These cars have a seating capacity of 86 and are constructed with center vestibules with side entrances between the general passenger and smoking and the smoking and colored compartments. This is the initial equipment of this character purchased by this Company, and are known as the 70-B-8 type and weigh approximately 51 tons. As in the other type, the details of construction conform generally to the standard G. E. gas-electric motor cars.

The trucks under both types of cars are of the heavy swing bolster, equalized type.



Brill Exhibit at A. E. R. A. Convention

THE above illustration shows a part of the Brill section of the Exposition held last month at Atlantic City in connection with the annual convention of the American Electric Railway Association. In the foreground is the new 76-E Two-Motor, Center-Pivotal Truck which has the Brill Graduated Spring System, used also in the 39-E Single-Motor Truck. The "Radiax" Truck, which will be seen in the distance, has one pair of wheels in a radiated position as if they had entered a curve. Elevated on stands at the far side of

the "Radiax" Truck is a solid-forged side frame with springs, etc., of a 21-E Single Truck showing the Brill "Wide-Wing" Journal Box. Car seats of the "Winner" and other types, and rolls of woven rattan seating of Brill manufacture, were displayed. At the right of the center of the picture is an electrically illuminated photograph stand containing large views of steel, part steel, and wooden cars built within the present year. Outside of the building was exhibited a low-level convertible car of the Third Avenue Railway Company's type, of which 49 have been built.

SAFETY CAMPAIGN MATERIAL

These pages have been prepared in response to requests for Children's Safety Campaign material. It is suggested that typewritten copies be sent to newspapers without mentioning BRILL MAGAZINE. Newspapers, especially evening and Sunday editions, usually have a "Children's Section" where articles, paragraphs and verses on safety subjects would be gladly reprinted and would be read by large numbers of children. "Safety First" propaganda can be considerably assisted by the frequent publication in newspapers of material clipped from literature of all classes by someone in the railway offices appointed to attend to the task.

"Safety First" Code for Children

Set the example of Safety First to those who are younger.
Always look before crossing streets and use regular crossings.
Fast legs are not as safe as sharp eyes at street crossings.
Ends of wagons are dreadfully dangerous to catch hold of.
Think of the car or auto coming behind a car, and wait.
Your ball or your hat had better be run over than you.
Fun on the tracks may mean a funeral for you.
In rainy weather hold your umbrella up at crossings to see the cars.
Roller skating, riding and coasting are dangerous in car streets.
Stones thrown at cars break glass which may blind or even kill.
Take care when you start to do anything to remember Safety First.

To Parents and Teachers

NO matter how much the trolley company does to make cars safe with careful conductors, ready life-guards, quick-acting brakes, and loud alarm gongs, there is always danger to children who live along trolley lines or who cross the tracks going to and from school. Constant teaching and warning at home and at school will keep the dangers before the minds of children till carefulness becomes a habit. There are parents who think that children gain self-reliance by looking out for themselves, and no doubt this is true to a large extent. But there are dangers connected with street railway cars which children do not understand or which they easily forget, and it is surely wiser and safer to remind them often of these perils of the streets.

Children

IF you live on a street where the trolley cars run,
Keep away from the tracks while you're having your fun.
Trolley cars can't turn out if you run in their way
And can't stop very quickly, so watch where you play.

Never dart behind wagons or cars going past,
For you might run in front of a car coming fast;
'Tis a thing that may happen when chasing a ball,
Or your hat, or you've run when you've heard someone call.

Roller skating in streets is a dangerous thing,
But 'tis mostly to you who run after and cling
To the back of a wagon or car running slow—
You are taking a much bigger risk than you know.

When you ride on your wheel don't get close to the side
Of a car that is running, but make the space wide.
And 'tis dang'rous to follow along at the back,
As you can't see what's near when you steer off the track.

If you see a long wire hanging down anywhere,
Keep away and tell others around to take care.
Though it looks very harmless its looks may deceive—
Electricity's deadly, you'd better believe.

Where you've car tracks to cross going to and from school,
Use the regular crossings and make it a rule
Not to start from the curb till you've looked every way,
And walk quickly across, never linger to play.

On the days that it rains take particular care
That you hold your umbrella high up in the air
When you start to cross streets where the trolley cars go,
For you can't see the cars if you hold it down low.

When you ride on a car and can get a front seat,
Watch the motorman close as he watches the street.
If a child is in danger he's quick with the brakes
While he clangs on the gong. My, the care that he takes!

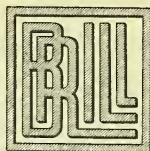
You can count on the motorman doing his best,
For he knows all the dangers; but you must watch lest
You forget any warning. Now, don't forget this—
Safety first, last and always with never a miss.

Safety Clubs in Schools

A "SAFETY CLUB" formed of school children is suggested as a means of stimulating and retaining the attention and interest of children in safety matters. If it should meet with approval of the school authorities, a regular organization might be effected by the children themselves under the supervision of a teacher or older scholar. The idea is to have the membership comprised of boys and girls of any age up to, say, 12 or 13. It might be advisable to have separate clubs for boys and girls. To increase the desire on the part of children to become members, a short examination might be prepared on a simple code of safety principles, the satisfactory answers to which would qualify for membership and a certificate of membership be issued; a badge made of a button covered with the "safety colors"—red and green—would help to interest them. A valuable part of the work of the club might be the formation of a "Safety Squad" in each block or section in the neighborhood; these squads to be made up of, say, five children to each—not necessarily members of the school—and the captain to be a member of the club and the one to form the squad. The children composing these squads would be the young safety guardians of the block or section, and their duties would be to tell other children what their captains tell them of the safety ideas brought out at the club meetings; they would also be expected to set an example of carefulness to prevent accidents to themselves and others, guard younger children from dangers and warn them of consequences, learn first aid to the injured, etc. Reports of squad captains would tend to make weekly meetings interesting. Co-operation between safety clubs of different schools would prevent encroaching on each other's territory. One of the features might be a special monthly meeting under the auspices of the club, or associated clubs, when a representative of the street railway company, of the Department of Public Safety, or of one of the civic associations would be glad of the opportunity to address the children on safety subjects. Literature and clippings for reading at the weekly meetings could be collected by a committee, and in many ways such a club might do a far-reaching work towards educating children in accident prevention in their homes as well as on the streets. (The Safety Club idea has been successfully worked in a number of cities and there are doubtless many places where it may be of great service.)

Changes of Address

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.



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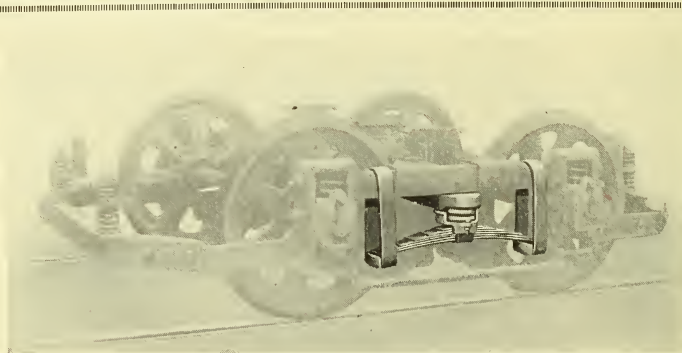
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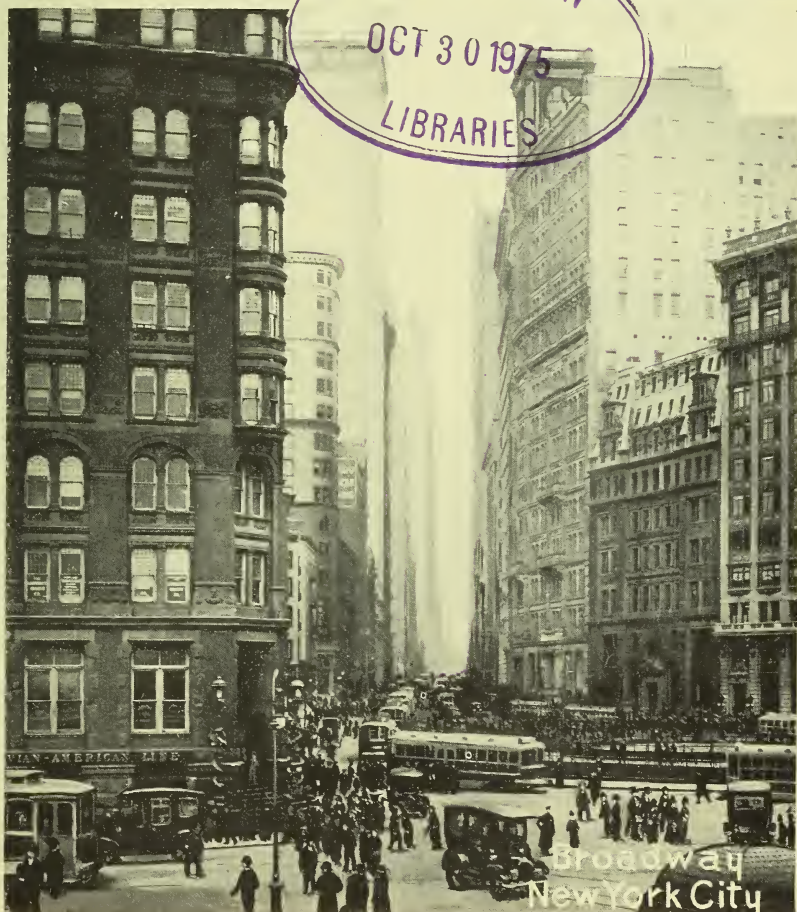


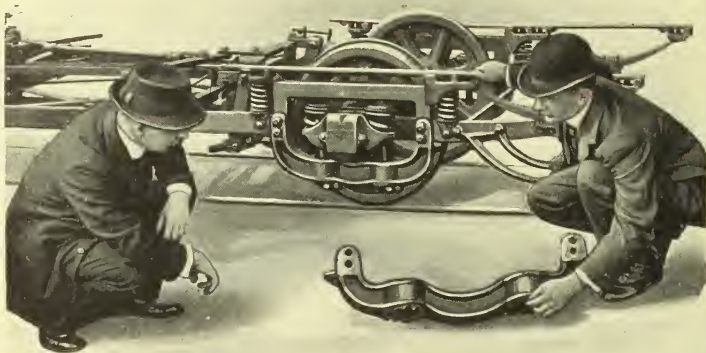
Brill Graduated Spring System

TRUCK SPRINGS are made for maximum loads, and it takes the maximum load to get the best action, the smoothest motion to the car, out of them. This means that the springs are too stiff to give easy riding to the lightly loaded car. And yet cars run lightly loaded most of the time. The Brill Graduated Spring System has two kinds of spring action, one for light loads and one for heavy. Of course there is some play of the semi-elliptics with the bolster coil springs, but it is the coil springs that give the smooth motion to the lightly loaded carbody, because they are quicker and softer in their action; while the semi-elliptics, being friction springs, are slower and therefore suited to cushion the heavier load. By light loads is meant any load up to nearly a full load of seated passengers; above that load the seat castings of the coil springs come in contact with the bolster, and these springs stop acting. The 76-E Truck is shown in the above illustration. The Brill Graduated Spring System is also a standard feature of the 39-E Single-Motor Truck.

THE J. G. BRILL COMPANY
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BRILL MAGAZINE

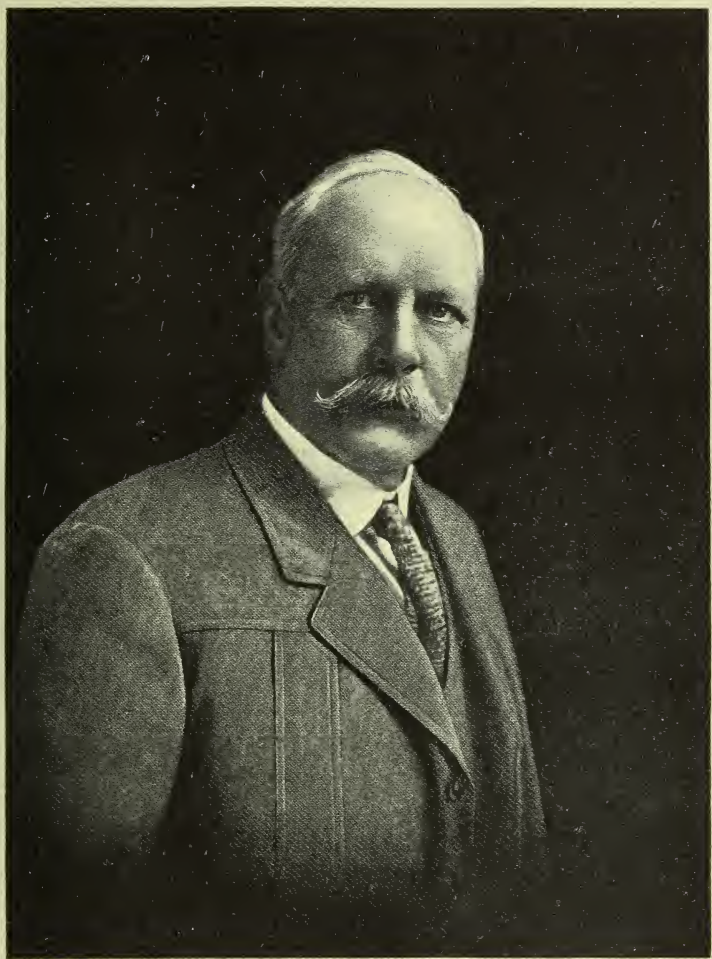




THE BRILL "RADIAX" TRUCK

FIFTY orders for the Brill "Radiax" Truck, with a number of repeat orders, are the convincing proofs of success. The long swing-links, which of themselves permit a considerable radial movement without assuming excessive inclination, are mounted on spiral springs on each side of the journal box. At the lower end of each link are two pins which engage in grooves on the lower side of the yoke brace. Whenever a movement of the links occurs, one of these pins is forced out of engagement and sets up automatically a powerful tendency to return to normal position. This arrangement allows free radiation on curves and holds the car steady on straight track. Solid forged side frames are an essential feature.

THE J. G. BRILL COMPANY
PHILADELPHIA, PENNSYLVANIA



John D. Spreckels

PRESIDENT, SAN DIEGO ELECTRIC RAILWAY COMPANY

Coördination

There came a time in the development of great industrial enterprises when interdependent relationship was recognized as a powerful factor in securing stability in expansion, and "Coöperation" became the watchword of the day.

Then followed the "Efficiency Era" and with it came another watchword—"Coördination."

Coöperation is extensive. Coördination is intensive.

Coördination is the selecting and working of men and equipment, of plans and events, to produce harmonious and reciprocal relationship.

A man must coördinate himself for useful and successful service, no matter what that service is.

To be a leader of men demands self-coördination in a superlative degree.

Under well coördinated leadership whose watchword is "Coördination," lost motion, friction, waste, futility and dissatisfaction are eliminated by the meshing, balancing and compensating of properly related parts of the whole, which is coördination

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John D. Spreckels



JOHN DIEDRICH SPRECKELS, President of the San Diego Electric Railway Company, was born in Charleston, S. C., August 16, 1853. His parents moved to California in 1855, and he has been a resident of that State ever since. At the age of fourteen he was sent to the Polytechnic School, at Hanover, Germany, and after completing a four-year course he returned to San Francisco and entered the sugar industry. He and his family acquired thousands of acres of plantations in the Hawaiian Islands; in order to handle the shipping, they built a fleet of sailing vessels, and organized the Oceanic Steamship Company. One of his early connections with the street railway business was the purchase, with his brother, Adolph B. Spreckels, of the San Francisco & San Mateo Electric Railway, which after reconstruction was sold to eastern capitalists who acquired other lines in the city, and all were finally consolidated into the United Railroads of San Francisco. He first visited San Diego in 1887 and the city gave him a wharf franchise in the hope of securing his interest in the shipping business. He built a wharf and coal bunkers and commenced shipping coal into San Diego. Soon after he became interested in Coronado Beach and the erection of Hotel del Coronado. He and his brother bought the San Diego horse car line in 1890. After reconstructing and electrifying the lines, operation was commenced with twelve 24-passenger cars. The system now comprises a trackage of 71 miles, operates 68 cars on a daily schedule, and last year carried 27,700,000 passengers. Mr. Spreckels is the President of three steam railways centering at San Diego and of a number of large industrial and commercial enterprises, and is the proprietor of two San Diego newspapers.

Conditions Which Govern the Type of Car for City Service

New York City

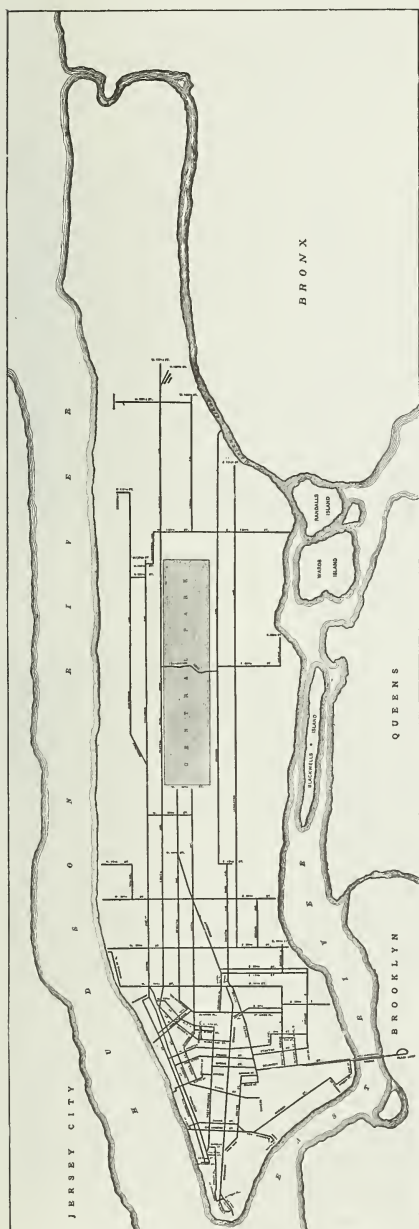
THE five boroughs of New York City have a combined population of 5,600,000, nearly half of which is in the Borough of Manhattan. Manhattan occupies an island thirteen miles long, and two miles wide for two-thirds its length and one mile or less for the remaining third at the northern end. It is the smallest of the boroughs and has an area of but 22 square miles. In addition to the populous boroughs on three sides, there are three cities on the west and two on the north which have transit connections with Manhattan similar to the boroughs and, with their thickly inhabited suburbs, have a combined population of nearly 2,000,000; therefore, Manhattan, with its 2,500,000 population, is surrounded by a population of nearly 5,000,000.

Communication between Manhattan and the surrounding boroughs and other cities is provided on the east by three bridges, one tunnel, and eight ferries to Brooklyn, one bridge, one tunnel (another tunnel is in course of construction) and four ferries to Queens; on the north, by a dozen bridges across the Harlem River Ship Canal to the Bronx; on the west, by three tunnels and ten ferries to Jersey City, Hoboken, and

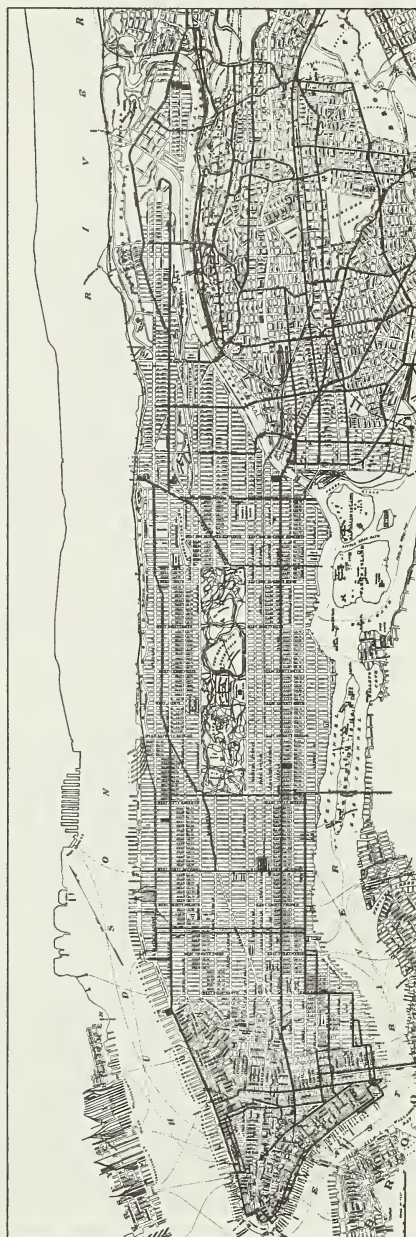
Newark; and on the south, by a ferry to Richmond. While the daily influx and exodus of people doing business in the lower part of Manhattan is from and to every direction, the major part of the morning and evening transportation is by means of the subway and elevated systems of the island. There are four elevated systems and one four-track subway; the capacity of these is overtaxed, and other subways are in the course of construction.

From the southern point of Manhattan Island north about two miles the streets are somewhat irregular, as this is the old part of the city, and the street layout parallels the water front on both sides. Above this, the cross streets, with rare exceptions, all run at right angles to the longitudinal avenues and practically all are regular as to width and distance apart. The old district is closely covered with a network of surface railways, out of which lead lines on nearly all the avenues. Central Park, at the center of the island, occupying a space one-half mile wide and two and one-half miles long, interrupts two longitudinal lines; otherwise, most of the avenues have double-track surface lines for practically their entire length.

The main crosstown lines, which were primarily built for service in



New York Railways Company's System



Third Avenue Railway Company's System

SURFACE RAILWAYS OF THE BOROUGH OF MANHATTAN



NEW YORK TRAFFIC CONDITIONS AND CARS. Delancey Place, looking west from end of Williamsburg Bridge. The street structures are entrances and platforms for the underground terminal for cars of Brooklyn Rapid Transit surface and elevated lines



NEW YORK TRAFFIC CONDITIONS AND CARS. A closer view from the end of Williamsburg Bridge. Cars from all directions cross the bridge or pass at the entrance. This point is the southeastern corner of a square mile of the densest traffic area of the city, and is served by both New York Railways and Third Avenue Railway Systems

conjunction with the ferries, have played an immensely important part in the development of Manhattan, as their main transfer points, particularly at Broadway and the central avenues, have been the nuclei of the shopping centers which have successively grown to large proportions. In the early horse-car days, those centers were on Broadway at Fulton, Chambers and Canal Streets; later at 14th Street, where 6th Avenue was also developed. Quicker transportation by cable cars was soon followed by still faster electric cars, and 23d Street took the lead as the shopping center. The past decade has seen 34th Street take precedence. While this northward advancement from center to center of the main crosstown intersections was proceeding, Broadway and the principal avenues were growing in similar importance between the centers, and changing character in certain sections from wholesale. The importance of the 42d Street crosstown lines was established by the Grand Central Station, from which the New York

Central and New Haven railway systems serve a vast suburban area. At the lower end of Central Park, the 59th Street lines connect the east and west side avenue lines and



NEW YORK TRAFFIC CONDITIONS AND CARS. Looking north on Broadway, with 14th Street in foreground. Union Square is occupied as a construction base for the Broadway Subway. To the left, on 14th Street, was the former chief shopping center, and remains an important business and transportation thoroughfare

cross the Queensborough Bridge. The east and west sides are connected by a line across the center of the park, with its eastern terminus at a ferry to Queens. Im-

mediately north of the park, the 110th Street lines cross from the east water front, diverge at the center of the northern park boundary, and take a diagonal route to a ferry at 130th Street. The 116th Street lines furnish a highly important link in the crosstown system. In the northern part of

207th Streets serve chiefly to connect the longitudinal systems with the vast network of lines in the Bronx. The great number of cross-town lines in Manhattan entails an issuance of more than fifty per cent. of transfers—an amount in excess of any other of the large city railway systems.



NEW YORK TRAFFIC CONDITIONS AND CARS. Twenty-third and Broadway, at southwest corner of Madison Square. The next great retail center to be developed after 14th Street. To the left of the center of the photograph is the lower part of the 700-ft. Metropolitan Tower. The square is entirely surrounded by "skyscraper" office buildings

Manhattan, the principal business thoroughfare is 125th Street; the distance from the lower part of the borough is sufficient to secure patronage for department stores, theatres, etc., on a large scale; the traffic of these lines is, therefore, local to a large extent. Above 125th Street, the island becomes narrower, and the crosstown lines at 135th, 145th, 155th, 181st, and

While the longitudinal surface lines are long in most cases, the average passenger trip is short, as the traveling public uses the readily accessible subway and elevated systems for any considerable distance. The surface cars are, therefore, continually changing their loads of passengers, the principal loading and unloading points being the main crosstown line intersec-



NEW YORK TRAFFIC CONDITIONS AND CARS. Broadway from Herald Square to Times Square. In the foreground is the 34th Street crossing. To the right outside the picture is 6th Avenue. More cars pass here per minute during rush hour periods than at any other street traffic point in the world. This is the center of the greatest shopping and hotel district in Manhattan. Pennsylvania Station one block west; northern terminus of Hudson-Manhattan Tube System at 6th Avenue and 33rd Street. Station of Broadway Subway will replace subway construction building shown at the right. Photograph made from 6th Avenue Elevated Railway Station

tions. It can be readily imagined that there are wide differences between the density of traffic of the various sections of each of these longitudinal routes. This condi-

tion is met by systematically switching cars back at a large number of points and thus providing each of the business sections with adequate equipment for its re-



NEW YORK TRAFFIC CONDITIONS AND CARS. Times Square, looking north from Times Building, showing intersection of Broadway and 7th Avenue at 45th Street. The construction base in the foreground is for the 7th Avenue Subway, which will join the present Interborough Subway at this point. Hotel Astor is shown at the left and Rector's at the extreme right. The main cross-town lines of this section are at 42d Street



NEW YORK TRAFFIC CONDITIONS AND CARS. This photograph inadequately shows the "Circle", the intersection of Broadway, 8th Avenue and 59th Street, at the southwest corner of Central Park. An important transfer point for "East Side" destination points and via Queensborough Bridge. An Interborough Subway Station is here. This is a center for automobile sales agencies, and to the right of the picture, down Broadway to Times Square is known as "Automobile Row"



NEW YORK TRAFFIC CONDITIONS AND CARS. Lenox Avenue at 116th Street. This is the central longitudinal thoroughfare north of Central Park, and serves a densely populated area. The lines extend from 146th Street to 116th Street, where they branch east and west. Subway entrances are shown at both sides of the avenue



NEW YORK TRAFFIC CONDITIONS AND CARS. Looking east on 125th Street from elevated railway station at 8th Avenue. This is the chief shopping and theatre center of northern Manhattan. Stations of the two elevated, two subway, and one steam railway systems are along this route, in addition to important surface railway transfer points at nearly all the avenues

quirements during the different traffic periods of the day. The favorable location of car houses is, of course, an important factor in keeping the necessary number of cars in operation.

The surface railway lines of Manhattan are operated by two corporations, the New York Railways Company and the Third Avenue Railway Company. The

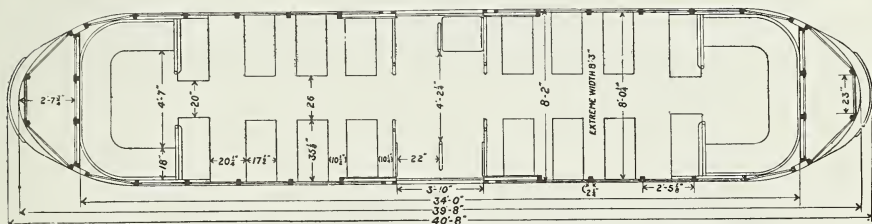
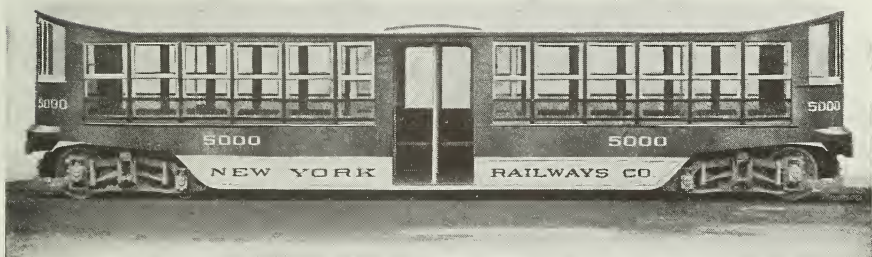
pany, operating the subway and elevated systems, which have a combined trackage of 203½ miles. The Third Avenue Railway Company controls the Union Railway Company, operating in the Bronx, Yonkers, Mt. Vernon, and other parts of Westchester County, and having a combined trackage, inclusive of its lines on Manhattan Island, of 356¾ miles.



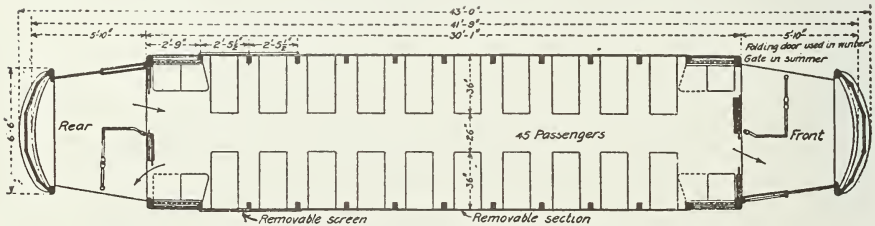
NEW YORK TRAFFIC CONDITIONS AND CARS. Third Avenue Elevated Railway station at 125th Street spans the busiest crossing and junction of surface lines of the 125th Street System. The main car house, shops and offices of the Third Avenue Railway Company are at 3d Avenue and 129th Street, and just beyond is the bridge across the Harlem Ship Canal, from which radiate a large number of this company's lines in the Bronx

former has 163 miles of track, and the latter 119 miles; both are comprehensive systems covering the entire borough through different streets and avenues, and in some cases using the same tracks for short distances. The New York Railways Company is under the same controlling interests as the Interborough Rapid Transit Com-

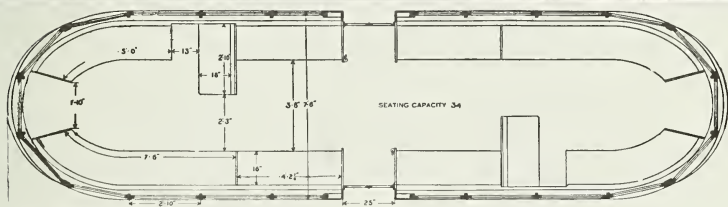
Many of the cars used by both companies on the surface systems of Manhattan are of the longitudinal-seat, prepayment-platform type; but these are being replaced by the "Third Avenue Convertible" type, which was described and illustrated in detail in the May, 1909, issue of BRILL MAGAZINE, and the New York Railways



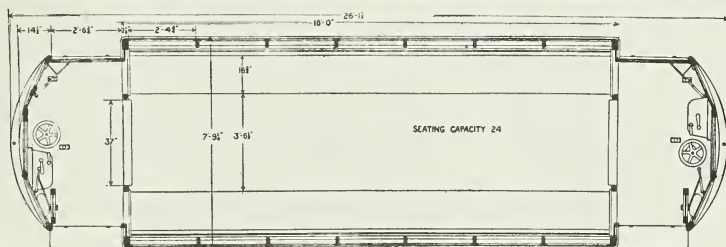
NEW YORK TRAFFIC CONDITIONS AND CARS. Standard steel car of the Broadway System of the New York Railway Company, known as the "Public Welfare" type. Central floor but 7 in. from pavement. Doors are electrically operated from conductor's central elevated position opposite entrance-exit. Motorman cannot start car before doors are entirely closed, and car must come to a stop before doors can be opened. Fares prepaid at conductor's change desk. The trucks are Brill Single-Motor Type with special bolster



NEW YORK TRAFFIC CONDITIONS AND CARS. Standard car of the Third Avenue Railway Company, known as the "Third Avenue Convertible" type. High wire screens are substituted in summer for the removable panels, which have integral sash. In addition to being arranged for prepayment fare collection, the platforms have folding seats for use at front end. Brill Single-Motor 39-E Trucks



Storage battery car of the New York Railways Company's steel low-level center-entrance type. Conductor's position and door operation similar to large car



Storage battery car of the Third Avenue Railway Company's standard type. Folding doors and steps operate in conjunction by crank handles. Entrance at rear and exit at front

"Public Welfare" type of low-level center-entrance car, shown in the issue of March, 1912. Both companies operate short storage

battery cars on certain lines where the installation of the conduit electric, required in Manhattan, is not practicable.

Combination Storage Battery Car for Steam Road

Brill 69-E Trucks

THE Cambria & Indiana Railroad, which has been operating a passenger service for a number of years in the sparsely settled mining district of Cambria and Indiana Counties, Pennsylvania, has recently extended its storage battery car service by the addition of the type illustrated, built by The J. G. Brill Company, having been purchased through the Railway Storage Battery Car Company. A large amount of iron ore and an-

thracite coal is hauled by the company from the mines in the district to Rexis, where a connection is made with the Clearfield and Cresson Division of the Pennsylvania Railroad. From Rexis, its southern terminus, the line extends northward over country having a grade of 1 per cent. for a distance of 11 miles. Then the grade becomes steeper, approximately 5 per cent., and for a distance of 2¼ miles it is necessary to operate with overhead trolley, the car being so constructed and equipped.



STORAGE BATTERY CAR FOR CAMBRIA & INDIANA RAILROAD. Passengers enter and leave at rear end only. Steel girder side construction and T-posts. Mounted on Brill 69-E Trucks

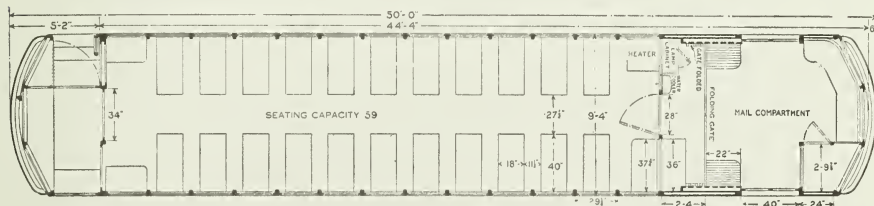


STORAGE BATTERY CAR FOR CAMBRIA & INDIANA RAILROAD. Passenger compartment, looking toward baggage compartment. Upper sashes stationary; lower sashes raise

Three round trips are made each day, averaging 75 miles, and the round trip requires about one hour, not including the stopover at Colver Heights, which is the northern terminus. At noon hour each day the car carries the em-

ployes of the company's power house up the steep $2\frac{1}{4}$ -mile switch-back to Colver Heights.

In addition to the passenger service, the car is designed to carry mail and small freight. A hardwood partition with swinging cen-



STORAGE BATTERY CAR FOR CAMBRIA & INDIANA RAILROAD. Length of baggage compartment, 12 ft. $0\frac{1}{2}$ in.; passenger compartment, 32 ft. $3\frac{1}{2}$ in. Height from track to side sills, 2 ft. $11\frac{1}{2}$ in.; side sills over roof, 8 ft. 6 in.; floor to center of headlining, 7 ft. $7\frac{1}{2}$ in.; track to first step, $19\frac{1}{8}$ in.; first step to second step, 13 in.; second step to floor, $10\frac{1}{2}$ in. Wheel base of trucks, 4 ft. 6 in.; diameter of wheels, 30 in. Total weight, 59,100 lb.

ter door divides the car into two compartments, the baggage end being subdivided into a mail compartment by a pantograph gate extending from the floor to the roof. Folding slat seats in this end of the car provides increased seating capacity. A motorman's com-

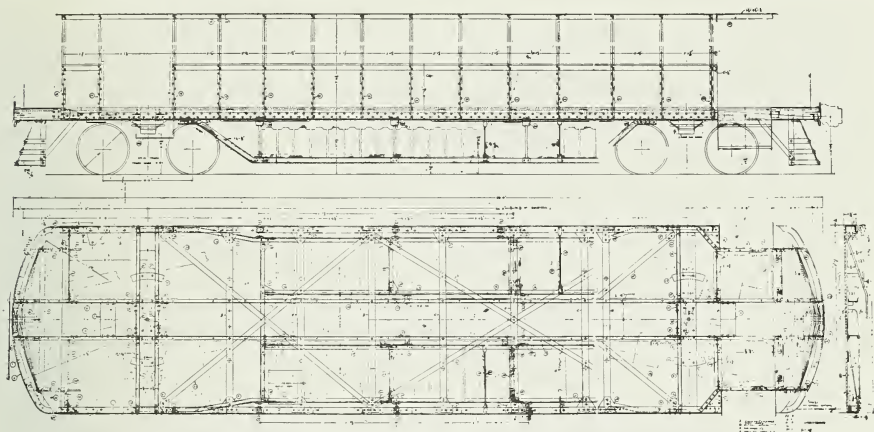
alcove visible in the passenger compartment, as shown in the interior photograph. The heater adjacent to the alcove is of the forced draft type. Cherry, stained mahogany, presents an attractive appearance in the finish of the passenger compartment; the ceiling is three-ply



STORAGE BATTERY CAR FOR CAMBRIA & INDIANA RAILROAD. Baggage-room, showing motorman's compartment. Pantograph gate divides this compartment into two sections, one for handling the mail

partment at each end in diagonal corners is equipped with a single entrance door, while a 4-ft. sliding door encloses each side of the mail compartment. The finish of the baggage end is dark lead color. Against the partition of this compartment is a water cooler, the spigot of which is enclosed in the

birch veneer. All transverse seats, with the exception of one against the baggage room partition, have reversible backs and are upholstered in pantasote. The upper sashes in the side windows are stationary, while the lower are arranged to be raised. In the round-end vestibule at each end



STORAGE BATTERY CAR FOR CAMBRIA & INDIANA RAILROAD. Side elevation shows battery cradle and cells between the trucks. Car is also equipped for trolley operation

of the car the single sashes drop into pockets, but the center one is arranged to be held at desired heights. On each side of the platform the opening is enclosed with Brill vestibule doors, and, as the steps penetrate the platform, trap doors between the door and the edge of the platform are used.

The battery equipment consists of 250 A-12-H type Edison batteries, 240 for power and 10 for lighting. This equipment weighs 11,250 lbs., and as shown in the exterior photograph is placed in a special compartment under the car.

The underframe construction is of steel, with the exception of 2 by 4-in. yellow pine members placed above 4 by 4 by 3/16-in. steel angle sills, both of which are securely bolted and riveted to a 3/32-in. steel side plate. As the accompanying diagram of the underframe shows, the outside knees which support the platform are 6-

in. 10½-lb. channels extending inwardly around the bolster 13½ in. on each side. Channel center stringers, 6 in. 10½ lb., extend from bumper to bumper. This construction is amply reinforced by steel diagonal braces, supports and gusset plates to meet the requirements of both storage battery and electric overhead trolley operation. Tee side posts riveted to 3½ by 2½ by ¼-in. angle top plate and to 3 by ¼-in. plate at the window rail provide a construction that is strong with comparatively light weight. Below the side and vestibule windows there is a sheathing of sheet steel.

The car is well designed and equipped throughout and makes an excellent appearance. The type sets a new standard for interurban service with this method of operation.

The Brill 69-E trucks have 30-in. wheels and are equipped with ball bearing journal boxes.

New Equipment for Northern Ohio Traction & Light Co.

City and Interurban Types

FIFTEEN semi-steel prepayment city cars, and five combination passenger and baggage cars with smoking compartment for interurban service, were recently delivered to the Northern Ohio Traction & Light Company by the G. C. Kuhlman Car Company. The interurban cars are the standard type of the system, being identical to those described in the July, 1908, issue of BRILL MAGAZINE, except that they are mounted on the Brill type of 27-MCB2 trucks for high-speed service. Those for city service, illustrated herewith, are an innovation on the company's lines, and are similar in many respects to a lot of fifty built by the same com-

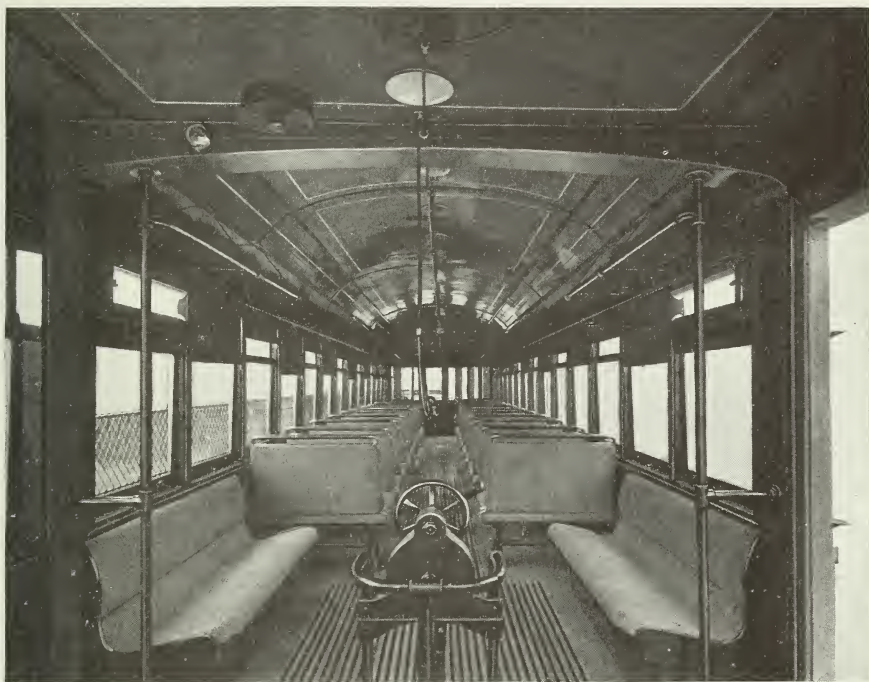
pany for the Cleveland Railway Company.

The entire system of the Northern Ohio Traction & Light Company comprises about 216 miles of track, spread over the northeast section of Ohio, beginning at Cleveland and extending in a general southerly direction down to Ulrichsville and including a large mileage of track in intermediate cities and towns, such as Akron, Canton, Cuyahoga Falls, Massillon and New Philadelphia. Branches of the system extend from Cuyahoga Falls to Silver Lake and Ravenna, from Akron to Barberton and Wadsworth, and from Massillon to East Greenville.

The new city cars are designed and equipped for single-end opera-



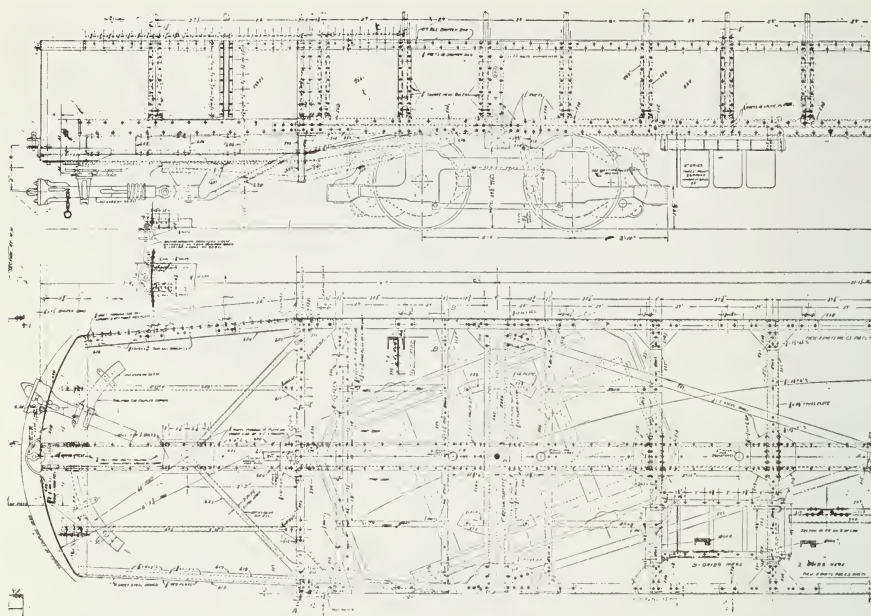
NEW EQUIPMENT FOR NORTHERN OHIO TRACTION & LIGHT CO. Steel side-girder bottomframe and steel body-end framing. Mounted on Brill 27 FE1 trucks



NEW EQUIPMENT FOR NORTHERN OHIO TRACTION & LIGHT CO. Wheel and lever in foreground control operation of doors and step. Note the route sign frames in upper part of rear windows

tion, having a 6-ft., 3-in. platform at the forward end with two-leaf folding door on the right-hand side; this platform is used only as exit, and the doors and simultaneously operating step are controlled by the motorman. At the rear end of the car the platform is 7 ft., 8 in. in length, and the door opening on the right-hand side is equipped with a pipe stanchion, as shown in the illustration of the exterior, extending from the center of the platform to the top panel; this separates the platform into entrance and exit. The folding doors on this platform are operated, together with a single folding step, by the conductor and are con-

trolled by the handle and wheel on the body end, shown in the above illustration. Body-end bulkheads are omitted, which, in addition to being a saving in weight, permits ample space for the incoming and outgoing passengers to pass the conductor's position at the body end. Additional clearance for moving passengers is obtained by long longitudinal seats at the body ends. All seats are upholstered in rattan, and those arranged transversely have stationary backs. The interior finish is red cherry, with all crevices in mouldings eliminated, so that there is no possibility of dust collecting and making the cars un-



NEW EQUIPMENT FOR NORTHERN OHIO TRACTION & LIGHT CO. Front half of bottomframe. The long diagonal members gusseted to the bolster and riveted to the crossings are composed of 9 by ¼-in. plate

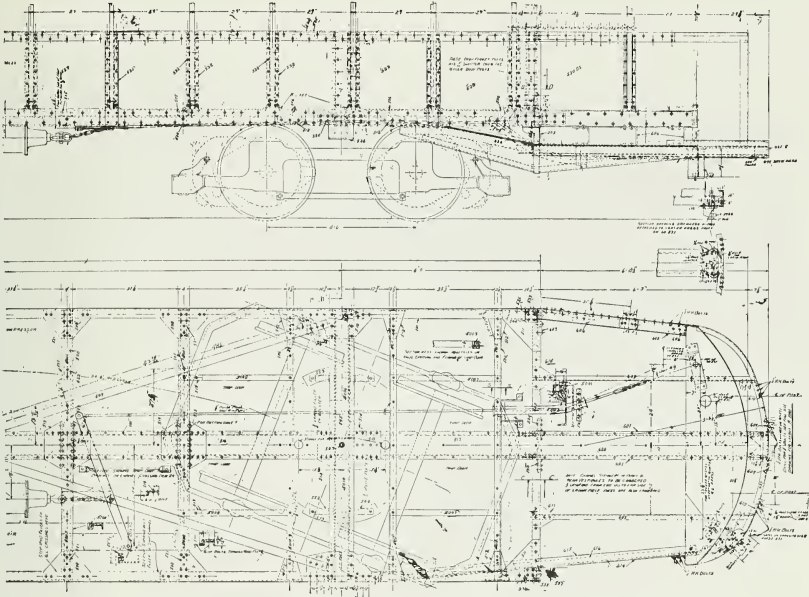
sanitary. All sashes are of the double type, the upper part being stationary and the lower arranged to drop.

The construction may be termed semi-steel, structural steel shapes being used in the underframe. On the devilstrip side of the car, the side sill, consisting of a built-up girder with 6-in., 15-lb. channel as the bottom member and a steel bar 5.4 lb. per foot, as a top member, with ⅛-in. steel plate on the outside, extends from bumper to bumper, whereas it terminates at the body corner posts on the door opening side. At each side post this plate is reinforced by two 1¼ by 1¼ by ⅛-in. steel angles, between which they are bolted. End sills are 12-in. 20½-lb. chan-

nels, secured at each end to the 6-in. channel of the side girder by angle connections and gusset plates. Center stringers consist of two 3-in. 4-lb. channels, secured together by a 10 by 3/16-in. cover plate; these members are connected to the end sills, besides being riveted to the bolsters and cross members. All cross members are of 4-in. 5.25-lb. channels, with flanges placed downward, trussed underneath by a 2½ by ¾-in. plate and secured to the center and side sills by 3/16-in. gusset plates.

All four body-end corner posts are of 4-in. 5.25-lb. channels and extend from side sill to side sill, forming an arch at the body end. Side posts are of ash, 1¾ in. thick.

Brill 27-FE1 trucks are used



NEW EQUIPMENT FOR NORTHERN OHIO TRACTION & LIGHT CO. Rear half of bottom-frame. Steel girder on devilstrip side extends from bumper to bumper

under the cars. These trucks are base, standard gage, and are designed with 4-ft. 6-in. wheel equipped with 33-in. wheels.

Semi-Steel Cars for San Antonio

Brill 76-E Trucks

THE San Antonio Traction Company purchased fourteen composite-frame cars, mounted on Brill 27-G1 Trucks, from the American Car Company the beginning of this year, and these were described in the April issue of BRILL MAGAZINE. Eleven cars of the same general type and appearance, but constructed with T-shape steel corner and side posts, have just been deliv-

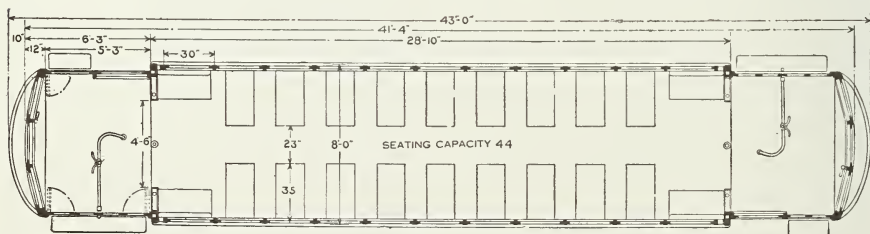
ered to the same company. The new cars are mounted on Brill 76-E type of trucks, which include the new graduated spring system for both light and heavy loads. San Antonio is the largest city in Texas, having a population of 96,600. It is situated on the San Antonio River, at the mouth of the San Pedro, in a section of the State celebrated for its fertility. The two rivers divide the city into three main sections, bridged at a number



SEMI-STEEL CARS FOR SAN ANTONIO. Double-end prepayment type. Lower sashes raise; upper sashes stationary, with continuous bottom rail. Mounted on Brill 76-E Trucks

of points. It is the center of an extremely rich live-stock and agricultural district, but in addition has some fairly important manufacturing interests, chief among which are malt liquors, flour and grist mill products. The railway company operates 78 miles of track, and its lines reach Electric Park, an amusement resort in the vicinity of San Antonio. The new cars, like the former order, are designed and equipped for double-end operation, having the usual controller arrangement on each platform, and seats with reversible backs. The platform at each end is 6-ft. 3-in. in length, and has a

two-leaf folding door for exit at diagonally opposite corners, and double doors for entrance and exit on the opposite side of the platform. Passengers enter by way of the rear platform and, therefore, the exit door to the conductor's right is kept closed and vice versa on the front platform. All doors operate in conjunction with the folding steps and are controlled by the motorman and conductor from their respective platforms. The total seating capacity of the new cars is 44 as against 40 in the previous order; this is due to the placing of a longitudinal seat for two passengers in each of



SEMI-STEEL CARS FOR SAN ANTONIO. Height from track to underside of side sills, 2 ft. 8½ in.; underside of side sills over trolley boards, 9 ft. 1½ in.; floor to center of headling, 8 ft. 1½ in.; track to step, 16 in.; step to platform, 15 in.; platform to floor, 8 in.; wheel base of trucks, 4 ft. 6 in.; diameter of wheels, 33 in.

the body-end corners instead of a short transverse seat for one person. Body-end bulkheads are omitted, reducing the weight considerably, and giving better clearance to entering and leaving passengers. Cherry finish is used in the interiors, including the reversi-

end sill to 12 inches inside of bolster; end sills are of oak, 4 by 5 $\frac{13}{16}$ in., reinforced on the outside by $\frac{5}{32}$ -in. steel plate; crossings consist of 3-in. 5 $\frac{1}{2}$ -lb. I-beams with $\frac{5}{8}$ -in. truss rods extending underneath. Steel angles, 2 by 2 by $\frac{1}{4}$ in., brace the construction at

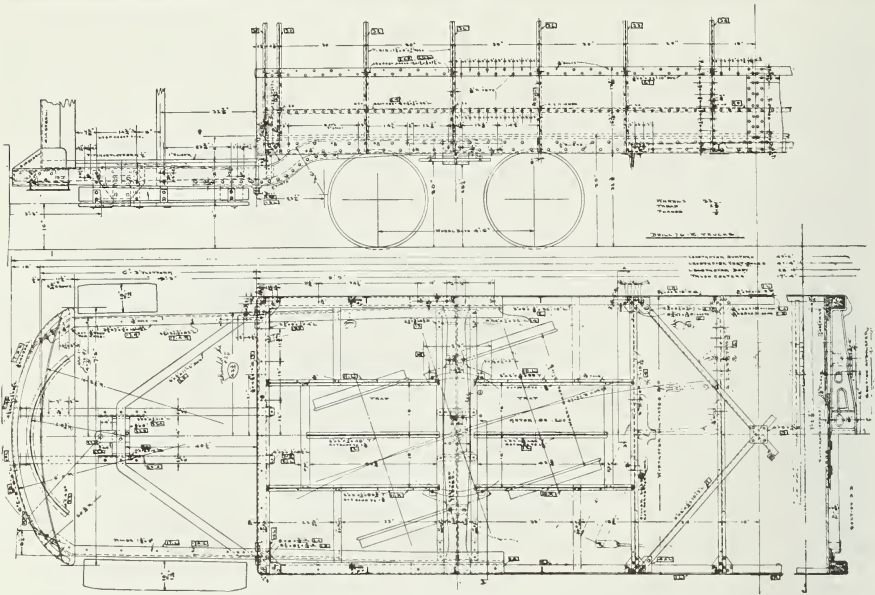


SEMI-STEEL CARS FOR SAN ANTONIO. Same general seating plan and platform arrangement as in previous order of cars; bulkhead with sliding doors is omitted in present design

ble-back slat seats. The ceilings are of agasote. All lower sashes raise, while the upper are stationary. The wide window guards are made in three sections to each side.

It is in the construction that the new cars differ considerably from the former order. In the underframe, the side sills are of steel angles, 5 by 3 by $\frac{3}{8}$ in., with 3 $\frac{1}{2}$ by 5-in. oak fillers extending from

the center, and 3/16-in. steel gusset plates are used at the intersection of the transverse and longitudinal members. The platforms are supported on outside knees of steel angles 3 $\frac{1}{2}$ by 7 by $\frac{1}{2}$ in., and 1 $\frac{3}{4}$ by 7-in. oak center knees. Oak fillers to which the platform is attached are used in the outside knees, and all knees, as shown in the diagram of the underframe on



SEMI-STEEL CARS FOR SAN ANTONIO. Side elevation and bottomframe diagram, showing T-post, upper framing and composite bottomframe

this page, are braced with a reinforcing angle of 3 by 2½ by 7/16-in. The cars are sheathed with a steel sheathing, 5/32 in. thick, both on the sides and under the windows in the vestibules. The side and corner posts are of

steel, with other framing of ash. The plain arch roof supports eight ventilators of the Brill "Exhaust" type, and a number of other Brill specialties, such as gongs, signal bells, etc., are of Brill manufacture.

The Brill Graduated Spring System has proved to possess such genuine merits in securing smooth riding to the car body when lightly loaded, that railway companies operating Brill 27-G trucks are having the spring arrangement changed to the new system. The change is readily accomplished and the trucks are transformed into the modern Brill 76-E type.

Eighteen-Passenger Omnibus for Southern New York

Hornell-Alleghany Transportation Co.

THE bus illustrated was delivered a few weeks ago to the Hornell-Allegheny Transportation Company by The J. G. Brill Company, and

the route is parallel to the tracks of the Erie Railroad, and since its inauguration has become so popular that the passenger traffic between these two points, formerly controlled almost exclusively by the



OMNIBUS FOR SOUTHWESTERN NEW YORK. Driver operates two-leaf door in conjunction with bottom step, which folds, the second step being stationary. Mounted on three-ton Chase chassis, with 165-in. wheel base.

is now in operation on a regular schedule between Alfred Village and Hornell, in southwest New York, running through the intermediate towns of Alfred Station and Almond, a distance of $11\frac{1}{2}$ miles. For nine miles of this distance, between Alfred Station and Hornell, which is a growing city with a population of some 15,000,

railroad, has been considerably diverted. Alfred Village, the southern terminus of the route, is the seat of Alfred University, which has a student body of about 175 young men and women. Formerly the only means of transportation between the university and the station, a distance of $2\frac{1}{2}$ miles, was a horse-drawn stage. This necessi-

tated a change to steam cars when traveling to Hornell, whereas the bus line affords a through route. It is chiefly due to this, in addition to the quick and comfortable service rendered, that it is now enjoying an increasing popularity with the

colors of Alfred University—purple and gold—harmonizing to give a very pleasing appearance. The body was designed, like all Brill-built busses, to meet the conditions under which it is operated. A three-ton Chase chassis, having a

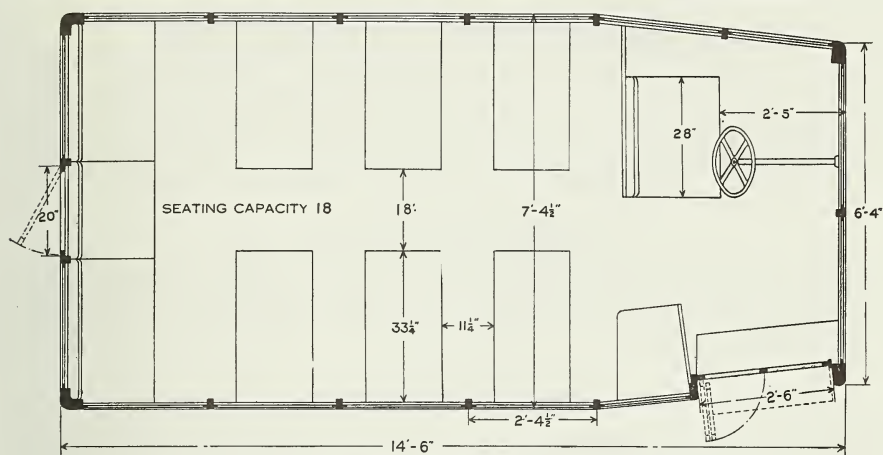


OMNIBUS FOR SOUTHWESTERN NEW YORK. Central section of rear seat, in front of emergency door, is removable. Lower sashes raise their full height; upper sashes are stationary. Interior finish, ash

students of the university. Those among the residents of the outlying districts who travel to Hornell on business also make up a large number of the patrons of the system. Three round trips are made by the bus each day, traveling in all about 70 miles.

A notable feature is the manner in which this bus is painted, the

wheel-base of 165 inches, supports an underframe constructed chiefly of ash, with three 3-in. channel crossings, webs vertically placed. In addition there are four $1\frac{3}{8}$ by 3-in. crossings, side sills of $2\frac{1}{4}$ by 4 in., front end sill $1\frac{3}{4}$ by 4 in., and rear end sill $1\frac{3}{4}$ by $5\frac{1}{2}$ in., all of ash. The posts in the body framing are also of ash and in-



OMNIBUS FOR SOUTHWESTERN NEW YORK. Height from underside of side sill over roof, 6 ft. 11- $\frac{13}{16}$ in.; floor to center of headlining, 6 ft. 9 $\frac{1}{2}$ in.; road to first step, 14 in.; riser, 11 in. Weight of body, 2,400 lb.; weight of chassis, 4,800 lb.; total weight, 7,200 lb.

clude corner posts, 3 $\frac{1}{2}$ in. thick, side posts 1 $\frac{1}{2}$ in. thick, and rear door post 1 $\frac{3}{4}$ in. thick. A poplar sheathing, $\frac{3}{8}$ in. thick, covers the body framing below the window rails.

The entrance-exit folding doors on the forward right-hand side of the body are operated by the driver in conjunction with the lower part of the step, and their position enables the driver to collect the fares in addition to his usual duties of running the bus. The upper half of the step is stationary and is set into the body beyond the side sill, which terminates at the body door post on this side of the body. Next to this door only a single seat is permitted, as shown in the diagram of the seating arrangement on page 000. Opposite the door opening on the left side is the driver's seat, upholstered in leather, the chassis being designed for left-hand drive. Under this seat is the gasoline

tank, affording a convenient and suitable compartment. The transverse stationary-back seats, the single seat next to the door opening and the cross-the-body seat against the rear end are upholstered in twill-woven rattan, all being of Brill manufacture. A central section of the rear seat is removable, being directly in front of the emergency door, which is controlled by the driver with the lever at the front end. All sashes are double, the upper part being stationary and the lower arranged to raise. A stationary hood directly in front of the driver's position prevents stormy weather obscuring the glass in front of his vision. The interior is finished in ash, and the roof boards and carlines of the ceilings show. In cold weather the bus is heated with heaters connected to the exhaust of the engine, with suitable valves so that the heat may be transferred to the muffler when desired.

SUGGESTIVE SUBJECTS

NOTE.—The purpose of these last pages is to supply executive officers with material suggestions—ideas that may prove useful in preparing their printed matter and placards, also pay-envelope stuffers, magazine material for employees, heart-to-heart talks in letters and literature. For such purposes the copyright is waived.

Why Not You?

IF the president of the company were to take a party of distinguished visitors over the lines, would you be the motorman or conductor selected for the car?

One of the Best

ARE you one of the best in your line of work? Do you stack up with the best in conduct and appearance? Do you see and know yourself as plainly as others see and know you?

Efficiency

EFFICIENCY—the power to do,
In safest, shortest, simplest way,
The most and best—will gain for you
More time and money every day.

The Right Idea

THE conductor or motorman who takes a personal interest in his work and feels that the company is *his* company and the car is *his* car, has the right idea.

Interest

A job becomes easier and actually pleasurable if interest is taken in it. Close attention and easy memorizing come from being interested. *Making* himself interested in his job is what puts a man in the front rank.

Be Prepared

DON'T wait till you are asked anything about the car, the route, or your duties before you frame up the answer. Be prepared.

Calling Streets

ONE of the ways that a conductor can give himself a good reputation is by calling streets clearly. This is an art that few acquire.

Be Courteous

THE passenger who seems to be stupid is probably only confused or maybe is a stranger. Be courteous.

The Courtesy Place

OF all the places in the world
Where courtesy means a lot,
The place conductors stand in cars
Most certainly is the spot.

But Don't Forget

WHEN a passenger asks to be let off at a certain street, say "Your street is about the _____th from here. Lest I forget you, please listen as the streets are called."

It's Up to You

GOOD habits, good health, and a good home—get them and keep them. Be clean, be cheerful, be courteous—be a success.

Looks and Feelings

THE way to keep yourself looking neat
And the way to feel just right,
Is to shine and brush and shave and bathe
'Fore going to bed each night.

Conductors

YOUR car is one of a chain of stores of which you are the manager and salesman. Your stock is transportation. Sell and deliver the goods like a good salesman and make your branch popular with your customers.

Advancement

IT is the policy of this company to endeavor to select men for its ranks who will be able to fill better positions when the occasion offers. All better positions are filled from within the organization whenever possible, and the standing of every man is carefully charted with that object in view.

Leading Articles for 1915

THIS issue contains the last of the series of leading articles under the caption "Conditions Which Govern the Type of Car for City Service," which has been continued for six years. The January issue will inaugurate a new series, entitled, "Interurban Centers and Interurban Cars." It is planned to handle these in a similar manner to the city car articles, and show in a general way the physical, social, commercial, and industrial characteristics of localities in their relation to interurban transportation and the development and adoption of certain types of cars.

Railway Employes' Publications

THE fact that a considerable number of monthly or quarterly employe's publications have been issued by electric railway companies for a number of years proves that they have been successful in promoting safety, efficiency, thoughtfulness, ambition, health and fellowship. A publication of this kind can be made up at a comparatively small expense if it is done on a modest scale and filled by the employes themselves. The Publicity Department of The J. G. Brill Company has some information about the costs of railway publications and also methods of producing and developing them without the necessity of calling upon professional publishers and writers, and would be glad to furnish this information on request.

Brill Magazine Tabular Index

THE tabular form of index devised and adopted for BRILL MAGAZINE four years ago has proved to be an efficient means of ready reference to articles on cars. Listing the cities, where the cars are operated, alphabetically, enables the desired articles to be readily located. Repeating the page number in several columns under various headings answers the purpose of cross reference and gives a clear idea of the type of each car. This accurate and simply constructed index increases the value of BRILL MAGAZINE as a reference medium for information on car design and construction.

Changes of Address

THOSE who receive BRILL MAGAZINE are requested to send in any change of address at the earliest opportunity. It will be more convenient in making up the mailing list if the new address is written on the envelope in which the magazine is received. Send to the Publicity Department, The J. G. Brill Company.

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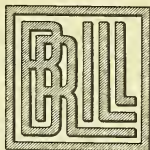
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